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FINAL MUNITIONS AND EXPLOSIVES OF CONCERN REMEDIAL INVESTIGATION QUALITY  
ASSURANCE PROJECT PLAN FOR SITE 12 EOD AREA NAS BRUNSWICK ME  
9/1/2013  
USA ENVIRONMENTAL INC

**FINAL**

**SITE 12 MUNITIONS AND EXPLOSIVES OF CONCERN  
REMEDIAL INVESTIGATION  
QUALITY ASSURANCE PROJECT PLAN  
FOR  
SITE 12 EOD AREA  
FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE**

**Submitted to:**



**Naval Facilities Engineering Command Mid-Atlantic  
9742 Maryland Avenue  
Norfolk, Virginia 23511**

**Submitted by:**

**USA Environmental, Inc.  
720 Brooker Creek Boulevard, Suite 204  
Oldsmar, Florida 34677**

**Navy Munitions Response Actions (MRA)  
Contract No. N62470-11-D-8007  
Task Order WE01**

**SEPTEMBER 2013**

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**FINAL SITE 12 MUNITIONS AND EXPLOSIVES OF CONCERN  
REMEDIAL INVESTIGATION QAPP FOR  
SITE 12 EOD AREA  
FORMER NAVAL AIR STATION BRUNSWICK,  
BRUNSWICK, MAINE  
SEPTEMBER 2013**

MRA  
N62470-11-D-8007  
CTO WE01





## EXECUTIVE SUMMARY

USA Environmental, Inc. (USA), was retained by the United States Department of Navy and contracted by Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic to perform a Remedial Investigation (RI) for Site 12, Explosive Ordnance Disposal (EOD) Area, at former Naval Air Station (NAS) Brunswick located in Brunswick, Maine. The work is to be conducted by USA via Contract Task Order (CTO) WE01 under the Munitions Response Action (MRA) at Vieques and Other Sites in NAVFAC Atlantic Area of Responsibility Contract Number N62470-11-D-8007.

### OBJECTIVES AND SCOPE

The objectives set forth in this project are to collect surface and subsurface information and, for specific areas, conduct removal of munitions and explosives of concern (MEC). The actions are necessary to support future risk management activities and subsequent transfer of the Site 12 EOD property in accordance with Base Realignment and Closure Act (BRAC) requirements. The primary focus of this Site 12 MEC RI is to determine the nature and extent of MEC within the Site 12 munitions response site (MRS), and conduct a MEC hazard assessment (MEC HA). The secondary objective is to evaluate non-munitions related subsurface materials, which will result in a better understanding and provide more data regarding the past use and current condition of the site. The findings of this investigation will augment the data collected in previous investigations.

The format of this work plan (WP) is based on the Uniform Federal Policy (UFP) for Quality Assurance Project Plans (QAPP), which was designed specifically for sampling and analysis for chemical constituents. As recommended by the Navy, the format is adapted to MEC investigations, and the WP format is identified as a MEC QAPP.

The scope of work is to investigate the subsurface anomalies within the boundaries of Site 12. Where possible and practical, digital geophysical mapping (DGM) will be conducted to detect and map all subsurface metallic anomalies. A statistical analysis of the data will be conducted utilizing Visual Sample Planning (VSP) “Anomaly Sampling for UXO,” which is a tool used to determine the number of isolated DGM anomalies to investigate based on the desired sample confidence level. Additionally, anomalies of interest, such as areas exhibiting a broad area electromagnetic response, may be manually selected for investigation. The proposed map and list of anomalies to be investigated will be reviewed by the project delivery team (PDT) comprised of the Navy, regulatory agencies, USA and other stakeholders. Areas that will not be accessible to DGM will be investigated by conventional detection using hand-held instruments followed by digging the detected anomalies.

Two areas within the Site 12 boundary are excluded from this investigation and are shown in Figure 2, Appendix A. They are the underwater area of the pond and the historical EOD berm area which is known to have a significant concentration of subsurface munitions related debris and MEC. The historical berm area is previously identified as Decision Unit #2 (DU-2), and is scheduled to undergo a removal action under a separate contract in 2014. The pond is to be investigated by USA under this CTO, but under a separate work plan.

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## ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material
AOC	Area of Concern
APP	Accident Prevention Plan
BEC	BRAC Environmental Coordinator
BIP	blow in place
bgs	below ground surface
B.S.	Bachelor of Science
BRAC	Base Realignment and Closure
BSI	blind seed item
CA	corrective action
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COB	close of business
COR	Contracting Officer's Representative
CSIR	Contractor Serious Incident Report
CSM	Conceptual Site Model
DCN	Design Change Notice
DDESB	Department of Defense Explosives Safety Board
DERP-FUDS	Defense Environmental Restoration Program - Formerly Used Defense Sites
DFW	definable feature of work
DGPS	differential global positioning system
DG	Digital Ground
DGM	digital geophysical mapping
DN	Deficiency Notice
DoD	U.S. Department of Defense
DSQ	Director of Safety and Quality
DQO	data quality objective
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ESQD	explosive safety quantity distance
ESS	Explosives Safety Submission
EZ	exclusion zone
FCR	Field Change Request
FS	Feasibility Study
ft	feet
GEO	Geophysical
GIS	Geographical Information System
GPS	Global Positioning System

GSV	Geophysical System Verification
HA	Hazard Assessment
HFD	hazardous fragmentation distance
HMX	high molecular weight RDX
IAW	in accordance with
IVS	instrument verification strip
MC	munitions constituents
MDAS	material documented as safe
MEC	munitions and explosives of concern
MFD	maximum fragmentation distance
MGFD	munition with greatest fragmentation distance
MPC	Measurement Performance Criteria
MPPEH	material potentially presenting an explosive hazard
MRA	Munitions Response Area also Munitions Response Action in reference to the contract
MRRA	Midcoast Regional Redevelopment Authority
MRS	Munitions Response Site
m	meter
mV	millivolt
N/A	not applicable
NAS	Naval Air Station
NAVFAC MIDLANT	Naval Facilities Engineering Command Mid-Atlantic
NAVSEA	Naval Sea Systems Command
NAVWEPS	Bureau of Naval Weapons
Navy	U.S. Navy
NCR	Nonconformance Report
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEDD/NIRIS	Navy Electronic Data Delivery System/Navy Installation Restoration Information System
NEW	net explosive weight
NFA	no further action
NOSSA	Naval Ordnance Safety and Security Activity
NTR	Navy Technical Representative
PA	Preliminary Assessment
PAL	Project Action Limit
Pd	Probability of detection
PDT	Project Delivery Team
pfp	percent false positives
PID	Photo Ionization Detector
PLS	Professional Land Surveyor
PM	Project Manager

POC	Point of Contact
POSM	Program Occupational Safety Manager
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QCP	Quality Control Plan
RDX	Research Department Explosive
RI	Remedial Investigation
RI/FS	Remedial Investigation and Feasibility Study
RPM	Remedial Project Manager
RTC	Response to Comments
RTK DGPS	Real Time Kinematic Differential Global Positioning System
SAP	Sampling and Analysis Plan
SI	Site Inspection
SNR	Signal-to-noise ratio
SOP	Standard Operating Procedure
SOW	Statement of Work
SUXOS	Senior UXO Supervisor
TBD	to be determined
TCRA	Time-Critical Removal Action
TNT	2,4,6-trinitrotolulene
TP	Technical Paper
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
USA	USA Environmental, Inc.
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXOTIII, TII, TI	UXO Technician Step 3, Step 2, and Step 1, respectively
VSP	Visual Sampling Plan
WP	Work Plan
WS	Work Sheet

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## **ATTACHMENTS**

APPENDIX A: Figures

APPENDIX B: Standard Operating Procedures

APPENDIX C: Contractor Forms

APPENDIX D: Additional Supporting Information

APPENDIX E. Regulatory Review and Response to Comments

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1.0 QAPP Worksheet #1: Title and Approval Page

FINAL

SITE 12 MUNITIONS AND EXPLOSIVES OF CONCERN  
REMEDIAL INVESTIGATION  
QUALITY ASSURANCE PROJECT PLAN  
FOR  
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FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

Submitted to:



Naval Facilities Engineering Command Mid-Atlantic  
9742 Maryland Avenue  
Norfolk, Virginia 23511

Prepared by:

USA Environmental, Inc.  
720 Brooker Creek Blvd., Suite 204  
Oldsmar, FL 34677

Prepared under:

Contract Number N62470-11-D-8007  
Task Order No. WE01

Review Signatures:

 10-1-13

Todd Bober./Navy RPM/Date

 9/30/13

Robert Hierholzer/USA Project Manager/Date

Approval Signatures:

 9/30/13

Robert Crownover/USA DSQ/Date

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## 2.0 QAPP Worksheet #2: Sampling and Analysis Plan Identifying Information

**Site Name/Number:** Former NAS Brunswick, Site 12 EOD Area

**Operable Unit:** Not applicable (N/A)

**Contractor Name:** USA Environmental, Inc. (USA)

**Contract Number:** N62470-11-D-8007, CTO WE01

**Contract Title:** Munitions Response Actions, Naval Vieques Training Range

1. This SAP was prepared in accordance with the requirements of *Guidance for Quality Assurance Project Plans, EPA QA/G-5* (U.S. Environmental Protection Agency (USEPA), 2002), *Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)* (USEPA, 2005) and *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4 2006) (EPA 2006).
2. Regulatory Program: Defense Environmental Restoration Program in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, Executive Order 12580, and the National Oil and Hazardous Substances Pollution Contingency Plan.
3. This SAP is a project-specific QAPP for MEC.
4. List organizational partners (stakeholders) and identify the connection with lead organization:

Organization Partners/Stakeholders	Connection
US Environmental Protection Agency (USEPA)	Regulatory Stakeholder
Maine Dept. of Environmental Protection (MEDEP)	Regulatory Stakeholder
U.S. Navy	Property Owner
Town of Brunswick	Future Property Owner
Midcoast Regional Redevelopment Authority (MRRA)	

5. Lead organization: Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MIDLANT)  
– Navy, Base Realignment and Closure (BRAC) Program Management Office East (PMO E)
6. Omitted QAPP elements:

The SAP worksheets that are not applicable to MEC projects are as follows: 19, 23, 24, 25, 27, 28, and 30. Since the UFP QAPP is a chemical quality plan for sampling and analysis, these sections were identified as N/A for MEC processes.

UFP-QAPP Worksheet #	Required Information	Included or Excluded
<b>A. Project Management</b>		
<i>Documentation</i>		
<b>1</b>	Title and Approval Page	<b>Included</b>
<b>2</b>	Table of Contents QAPP Identifying Information	<b>Included</b>
<b>3</b>	Distribution List	<b>Included</b>
<b>4</b>	Project Personnel Sign-Off Sheet	<b>Included</b>
<i>Project Organization</i>		
<b>5</b>	Project Organizational Chart	<b>Included</b>
<b>6</b>	Communication Pathways	<b>Included</b>
<b>7</b>	Personnel Responsibilities and Qualifications Table	<b>Included</b>
<b>8</b>	Special Personnel Training Requirements Table	<b>Included</b>
<i>Project Planning/Problem Definition</i>		
<b>9</b>	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	<b>Included</b>
<b>10</b>	Problem Definition, Site History, and Background. Site Maps (historical and present)	<b>Included</b>
<b>11</b>	Site-Specific Project Quality Objectives	<b>Included</b>
<b>12</b>	Measurement Performance Criteria Table	<b>Included</b>
<b>13</b>	Sources of Secondary Use Data and Information Secondary Use of Data Criteria and Limitations Table	<b>Included</b>
<b>14</b>	Summary of Project Tasks	<b>Included</b>
<b>15</b>	Reference Limits and Evaluation Table	<b>Included</b>
<b>16</b>	Project Schedule/Timeline Table	<b>Included</b>
<b>B. Measurement Data Acquisition</b>		
<i>Sampling Tasks</i>		
<b>17</b>	Sampling Design and Rationale	<b>Included</b>
<b>18</b>	Sampling Locations and Methods/ SOP Requirements Table Sample Location Map(s)	<b>Included</b>
<b>19</b>	Analytical Methods/SOP Requirements Table	<b>Excluded</b>
<b>20</b>	Field Quality Control Sample Summary Table	<b>Included</b>
<b>21</b>	Project Sampling SOP References Table Sampling SOPs	<b>Included</b>
<b>22</b>	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	<b>Included</b>

<b>UFP-QAPP Worksheet #</b>	<b>Required Information</b>	<b>Included or Excluded</b>
<i>Analytical Tasks</i>		
<b>23</b>	Analytical SOPs Analytical SOP References Table	<b>Excluded</b>
<b>24</b>	Analytical Instrument Calibration Table	<b>Excluded</b>
<b>25</b>	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	<b>Excluded</b>
<i>Sample Collection</i>		
<b>26</b>	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal and/or, Material Potentially Presenting an Explosive Hazard (MPPEH) Management	<b>Included</b>
<b>27</b>	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	<b>Excluded</b>
<i>Quality Control Samples</i>		
<b>28</b>	Quality Control (QC) Samples Table Screening/Confirmatory Analysis Decision Tree	<b>Excluded</b>
<i>Data Management Tasks</i>		
<b>29</b>	Project Documents and Records Table	<b>Included</b>
<b>30</b>	Analytical Services Table Analytical and Data Management SOPs	<b>Excluded</b>
<b>C. Assessment Oversight</b>		
<b>31</b>	Planned Project Assessments Table Audit Checklists	<b>Included</b>
<b>32</b>	Change Control Management	<b>Included</b>
<b>33</b>	QC Management Reports Table	<b>Included</b>
<b>D. Data Review</b>		
<b>34</b>	Verification (Tier I) Process Table – Preparatory and Initial Inspections	<b>Included</b>
<b>35</b>	Tier 2 Process Summary Table	<b>Included</b>
<b>36</b>	Product QC Tier 3 Process Summary	<b>Included</b>
<b>37</b>	Usability Assessment – Area of Concern (AOC) Certification Checklist	<b>Included</b>

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### 3.0 QAPP Worksheet #3: Distribution List

Entities that will receive copies of the Final SAP, subsequent SAP revisions, addenda, and amendments are listed below.

SAP Recipients	Title/Role	Organization	Telephone Number (optional)	E-mail Address or Mailing Address
Todd Bober	Remedial Project Manager (RPM)/Manages project activities for Navy	NAVFAC MIDLANT BRAC PMO E	215-897-4911	Todd.bober@navy.mil
Paul Burgio	BRAC Environmental Coordinator/Manages BRAC activities for the Navy	Navy BRAC PMO E	215-897-4903	Paul.burgio@navy.mil
Robert (Bob) LeClerc	NAS Brunswick Installation Point of Contact (POC)	NAS Brunswick Caretaker's Office	207-263-6736	Robert.leclerc@navy.mil
Dan Brubaker	MRRA/Planning and Environmental Manager	MRRA	207-798-6512	tomb@mrta.us
Steve Levesque	Executive Director/Oversees BRAC redevelopment projects	MRRA	207-798-6512	stevell@mrta.us
Carolyn Lepage (and Ed Benedikt)	Technical Advisor to Brunswick Area Citizens for a Safe Environment (BACSE)/Technically advises BACSE	Lepage Environmental Services (BACSE)	207-777-1049	calepage@roadrunner.com (rbenedikt@gwinet)
Denise Clavette	Business Development Manager Town of Brunswick Representative	Town of Brunswick Department of Community & Economic Development	207-721-0292 x1	dclavette@brunswick.org
Claudia Sait	RPM/Provides MEDEP regulatory input	MEDEP Bureau of Remediation & Waste Management	207-287-7713	claudia.b.sait@maine.gov
Michael Daly	RPM/Provides USEPA regulatory input	US EPA	617-918-1386	Daly.Mike@epamail.epa.gov
Linda Klink and assigned field QA representative	3rd Party QA Project Manager/Reviews WP for QA plan implementation	Tetra Tech	412-921-8650	Linda.klink@tetrattech.com
Robert Hierholzer, P.E.	Project Manager/Manages the CTO for the remedial contractor.	USA Environmental, Inc. (USA)	813-343-6339	rhierholzer@usatampa.com



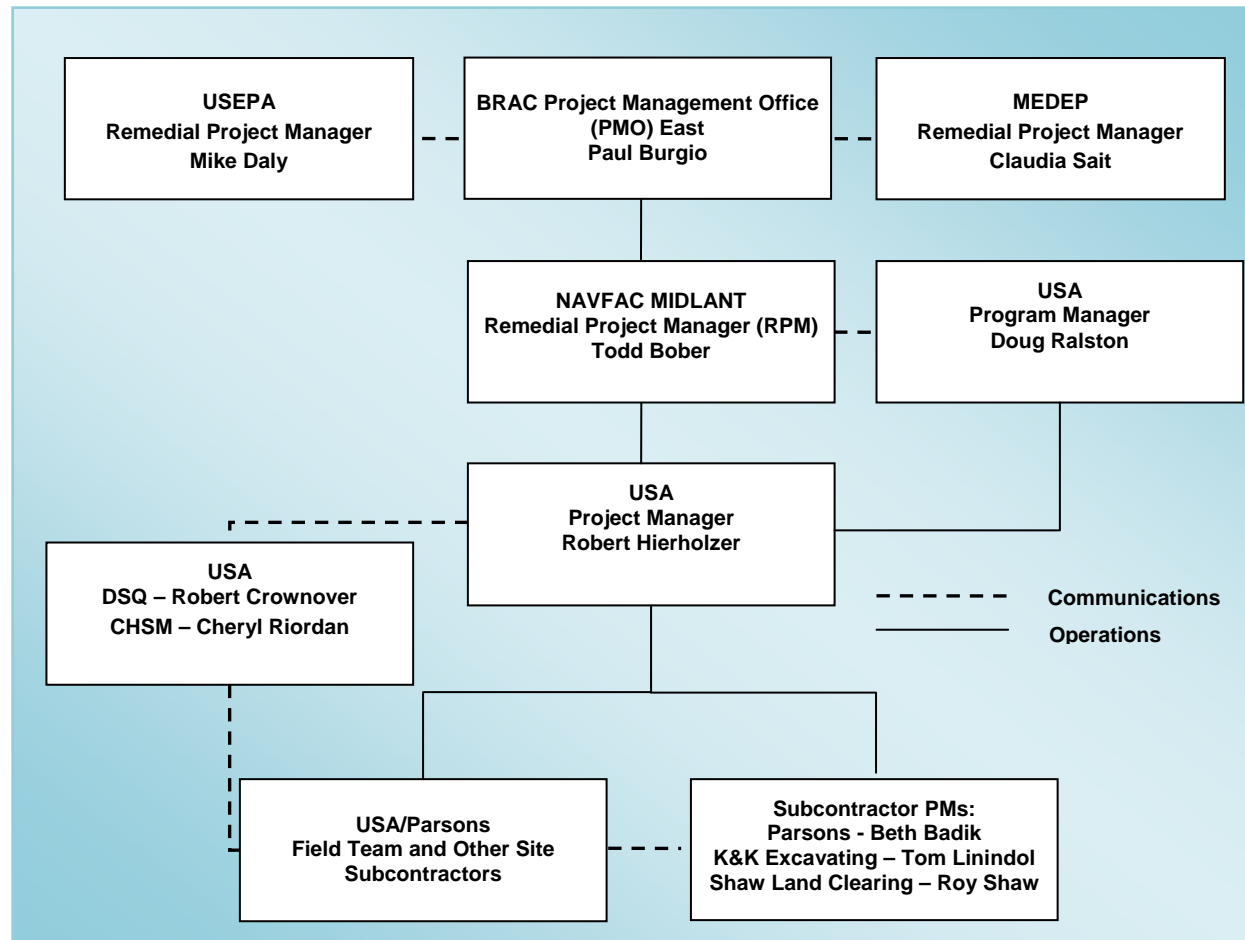
<b>SAP Recipients</b>	<b>Title/Role</b>	<b>Organization</b>	<b>Telephone Number (optional)</b>	<b>E-mail Address or Mailing Address</b>
Robert Crownover	Director of Safety and Quality (DSQ)/Responsible for remedial contractor's QC & Safety Program	USA	813-343-6364	rcrownover@usatampa.com
Al Crandall	Sr. Geophysicist/Designs geophysical survey plan and interprets field data	USA	813-343-6362	acrandall@usatampa.com
James Walden	Safety Manager/Manages safety submittals and field safety program	USA	813-343-6374	jwalden@usatampa.com
Brian Thompson	Senior UXO Supervisor/ Provides technical review and input and implements UXO Contractor field work	USA	813-777-3292	brianteod@gmail.com

#### 4.0 QAPP Worksheet #4: Project Personnel Sign-Off Sheet

Key personnel will read and understand applicable sections of the QAPP to ensure that their work tasks are performed as planned. The USA Project Manager will require that all supervisory personnel read and sign off on the applicable sections of QAPP before field operations are conducted.

Project Personnel	Organization/Title/Role	Telephone Number	(Optional) Signature/ E-mail Receipt	SAP Section Reviewed	Date SAP Read
Todd Bober	Navy RPM	215-897-4911	See Worksheet #1, Title and Approval Page	All	
Robert Hierholzer	USA/Project Manager	813-343-6339	See Worksheet #1, Title and Approval Page	All	
Robert Crownover	USA/Director of Safety and Quality (DSQ)	813-343-6364	See Worksheet #1, Title and Approval Page	All	
Al Crandall	USA Project Geophysicist	813-343-6362			
Brian Thompson	Senior UXO Supervisor (SUXOS)	813-343-6416			
Beth Badik	Parsons/Project Manager/Subcontractor for Digital Geophysical Mapping (DGM)	617-449-1565			
Nate Harrison	Parsons/ Project Geophysicist	303-764-8864			

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## 6.0 QAPP Worksheet #6: Communication Pathways

The communication pathways for field tasks associated with this QAPP are shown below.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
Overall implementation of the project	Installation POC Navy RPM BRAC PMO E USA PM	Bob LeClerc Todd Bober Paul Burgio Robert Hierholzer	207-263-6736 215-897-4911 215-897-4903 813-343-6339	Onsite POC for USA field management to notify the Navy of potential issues and to inform of the status of work progress. Navy RPM is the primary point of contact for technical issues and is to be contacted by USA after initial contact or attempt to contact the installation POC. Primary communication conduit to regulatory agencies. USA PM is the primary point of contact for all project issues during planning, implementation and reporting phases of the project.
Technical issues during implementation of the project (general)	Navy RPM USA PM USA SUXOS	Todd Bober Robert Hierholzer Brian Thompson	215-897-4911 813-343-6339 813-777-3292	Production and technical issues during field implementation of the work will be initiated by the SUXOS. Progress and issues will be communicated using phone and/or e-mail as appropriate to the USA PM. The USA PM will inform the Navy RPM as necessary via phone and/or e-mail.
Safety Issues	Navy RPM USA PM USA UXOSO	Todd Bober Robert Hierholzer	215-897-4911 813-343-6339	Safety issues will be communicated using phone and/or e-mail as appropriate to the USA PM. The USA PM will inform the Navy RPM as necessary via phone and/or e-mail.
Field Progress Notifications	USA SUXOS USA PM Navy RPM USEPA MEDEP	Brian Thompson Robert Hierholzer Todd Bober Mike Daly Claudia Sait	813-777-3292 813-343-6339 215-897-4911 617-918-1384 207-287-7713	SUXOS provides verbal and written daily progress updates to the PM by noon of the following workday. SUXOS provides written weekly progress reports to the PM by noon the following Monday. PM reports progress to the Navy RPM verbally as appropriate, and provides the weekly progress report by COB Monday (or the first work day of the following week) to the Navy. The Navy will forward weekly progress reports to USEPA and MEDEP (Project Team).

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
QA issues during implementation of the project	3rd Party QA Contractor (Tetra Tech) USA UXO Quality Control Specialist (UXOQCS)	Norm Piper  Charles Bobo	  704-840-8247	3rd Party QA will first discuss any issues immediately with the USA UXOQCS, then will inform the Navy RPM as required by the Navy.  QC issues and recommended or implemented corrective action is to be immediately communicated to the 3rd Party QA by the UXOQCS.
Work Plan Change	USA SUXOS USA PM Parsons PM USA DSQ Navy RPM USEPA MEDEP	Brian Thompson Robert Hierholzer Beth Badik Robert Crownover Todd Bober Mike Daly Claudia Sait	813-777-3292 813-343-6339 617-449-1565 813-343-6364 215-897-4911 617-918-1384 207-287-7713	USA field management (SUXOS and/or UXOQCS) will verbally inform the PM within 24 hours of realizing a need for a field change. The PM will contact the RPM verbally or via e-mail to discuss the condition requiring a field change and will initiate the Field Change Request (FCR) documentation process. The RPM will notify the project team via e-mail. The FCR, which includes all necessary changes to the written work plan and/or figures will be reviewed and approved by the USA DSQ, then e-mailed to the RPM for approval within 2 days of identifying the need for the change, if possible.
Changes to the field work schedule	USA PM Navy RPM USA SUXOS	Robert Hierholzer Todd Bober Brian Thompson	813-343-6339 215-897-4911 813-777-3292	USA PM will verbally inform the Navy RPM on the day that a schedule change is known as communicated by the SUXOS. The RPM or designee will inform the project team via –e-mail within 2 business days.
DGM data quality issues	Parsons Project Geophysicist USA Project Geophysicist USA UXOQCS USA PM Navy RPM	Nate Harrison  Al Crandall  Charles Bobo Robert Hierholzer Todd Bober	303-764-8864  813-343-6362  704-840-8247 813-343-6339 215-897-4911	Depending on the phase of the data analysis and processing, the geophysicist processing the data will notify whoever generating the data in question. If it has to do with the initial data collection, the UXOQCS and DGM field team will be notified. If it has to do with processed data, the USA Geophysicist will first contact Parsons Geophysicist. The USA PM will be notified if the data quality issue will result in rework. If rework is necessary the USA PM will notify the Navy RPM of the nature of the issue and potential impact to the schedule.

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathway To/From, etc.)
Discovery of evidence of potential environmental issue.	USA SUXOS	Brian Thompson	813-777-3292	Upon discovery of something of potential significant environmental interest, the SUXOS is to contact the installation POC right away with a phone call. The SUXOS will also contact the USA PM and/or Parsons PM and describe the situation and provide photos if possible. The Installation POC and USA PM will inform the Navy RPM of the discovery and what steps are being taken to prepare to investigate the item. The regulatory agencies will be notified of what was found and the proposed path forward so that they can provide guidance/input. Parsons PM will contact the project chemist if appropriate for the situation.
	Installation POC	Bob LeClerc	207-263-6736	
	USA PM	Robert Hierholzer	813-343-6339	
	Parsons PM	Beth Badik	617-449-1565	
	Navy RPM	Todd Bober	215-897-4911	
	USEPA	Mike Daly	617-918-1384	
	MEDEP	Claudia Sait	207-287-7713	



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## 7.0 QAPP Worksheet #7: Personnel Responsibilities Table

The responsibilities of key personnel associated with each organization, contractor, and subcontractor are described below.

Name	Title/Role	Organizational Affiliation	Responsibilities
Bob LeClerc	Installation POC	NAS Brunswick Caretaker's Office	On-site field surveillance. Coordinates communication of field work status or issues with the RPM and BRAC Environmental Coordinator (BEC).
Todd Bober	Navy RPM/Manages project activities for the Navy	NAVFAC BRAC PMO E	Oversees project implementation including scoping, data review, and evaluation.
Paul Burgio	BRAC Environmental Coordinator/Manages BRAC activities for the Navy	NAVFAC BRAC PMO E	Coordinates BRAC Environmental activities for the Navy.
Claudia Sait	RPM/Provides regulator input	MEDEP	Participates in scoping, conducts data review and evaluation, and approves the SAP on behalf of MEDEP.
Robert Hierholzer	Project Manager	USA	Oversees project, financial, schedule, and technical day-to-day management of the project.
Robert Crownover	DSQ	USA	Establishes and maintains the Quality Program and oversees program QC for the RI.
Brian Thompson	SUXOS	USA	Manage/Supervise field activities on a daily basis. Accountable for all unexploded ordnance (UXO) handling activities Specific duties as outlined in the project plans and SOPs
Al Crandall	Project Geophysicist	USA	Perform technical reviews of all deliverables. Performs DGM and intrusive results data analysis and develops the target list for intrusive investigation.
Nate Harrison	Project Geophysicist	Parsons	Provides oversight and coordination of geophysical data collection and processing, and assures that geophysical investigations are conducted in accordance with the QAPP. Reports to the USA Project Manager, but coordinates closely with the Site Manager, SUXOS, UXOQCS, and other project staff.
Tammy Chang	Project Chemist	Parsons	Provides professional recommendation in the event field teams discover possible items of environmental concern, such as; a buried drum with contents, stained soil, or possible asbestos containing materials (ACM).
Charles Bobo	UXO Safety Officer (UXOSO) and Overall Site Safety Officer	USA	Oversee all aspects of safety on this project Ensure that all fieldwork is conducted in accordance with (IAW) the WP and APP Provide safety direction to field staff and subcontractors

Name	Title/Role	Organizational Affiliation	Responsibilities
			Implement the occupational safety program Perform reviews, inspections, and surveillances of USA's (and its subcontractors') task order activities to ensure that task order procedures are being followed.
Charles Bobo	UXO Quality Control Specialist (UXOQCS)	USA	Dual-hat with UXOSO Conducts all QC procedures on site. Monitors QC activities to ensure conformance with authorized policies, procedures, and sound construction practices, and recommend improvements, as necessary.
TBD	UXO Technicians III, II, & I	USA	Adequately review the Work Plan and understand all SOPs and guidance applicable to their tasking for the project Conducts MEC clearance and anomaly avoidance activities.
TBD	Site Geophysicist	Parsons	Manages DGM Field Operations. Process and Analyze DGM data on a daily basis. Submits formatted data to the Navy in accordance with the requirements set forth in NAVFAC PAC's <i>Standard Operating Procedure (SOP) for Navy Environmental Information Transfer, Version 3.1</i> (or subsequent updates)

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## 8.0 QAPP Worksheet #8: Special Personnel Training Requirements Table

All project personnel will meet the qualification and specific training requirements identified in this table prior to being assigned to the project.

Project Function By DFW	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Mobilization/Site Preparation	Initial Site Orientation and Plans Review	SUXOS, UXOSO	Upon arrival to project site	All personnel	USA and Parsons Field Team	Documentation of special training requirements will be maintained on-site by USA
	29 Code of Federal Regulations (CFR) 1910.120 Training	Vendor	Prior to mobilizing to project site			
	Instrument Verification Strip (IVS) Certification	Site Geophysicist	Training will be conducted prior to commencement of field activities	UXO Teams		
	Use of Differential Global Positioning System (DGPS) equipment			Geophysical Survey Teams, UXO Teams, UXOQCS		
Vegetation Removal and Surface Clearance	MEC Safety Precautions and Task Specific SOPs	SUXOS, UXOSO		All personnel entering exclusion zone		
Intrusive Operations				UXO Qualified Team Members		
MEC/MPPEH Management and Disposal						
Geophysical Survey	Digital Geophysical Survey SOP 4	Project and Site Geophysicist		Geophysical Survey Team, Geophysical QC Manager, QC Technicians		
Geophysical Data Processing & Interpretation	Geophysical Data Processing & Interpretation SOP 3					

<b>Project Function By DFW</b>	<b>Specialized Training – Title or Description of Course</b>	<b>Training Provider</b>	<b>Training Date</b>	<b>Personnel/Groups Receiving Training</b>	<b>Personnel Titles/ Organizational Affiliation</b>	<b>Location of Training Records/Certificates</b>
Inspection of Possible Environmental Contamination	Site orientation and safety briefing.	USA UXOSO		Project Chemist or field personnel assigned to investigate an item of concern.	Parsons Field Personnel	

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## **9.0 QAPP Worksheet #9: Project Scoping Session Participants Sheet**

Date of Scoping Session: A specific scoping session was not conducted after NAVFAC issued the modification to USA to perform the investigation described in this work plan.

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## 10.0 QAPP Worksheet #10 Problem Definition and Conceptual Site Model (CSM)

This worksheet presents the problem statement and Conceptual Site Model (CSM) with respect to MEC characterization.

### 10.1 Problem Statement

The potential presence of subsurface MEC within the Site 12 EOD Area boundary poses a hazard to human health. Therefore, an investigation to determine the nature and extend of the potential MEC hazard is necessary.

### 10.2 Site Profile

#### 10.2.1 Site Identifier

Refer to Appendix A, Figure 1 (NAS Brunswick Site Location Map)

**Installation Name:** Former NAS Brunswick

**Installation Location:** Cumberland County, Maine

**Site Name:** Site 12 EOD Area

**Site Location:** Located in the southeastern portion of the installation, east of Ordnance Road and approximately 1,200 feet south of the new Marine Corps Armed Forces Reserve Center.

#### 10.2.2 Site History

It is unclear when munitions-related activities began at Site 12. However, based on a 1978 aerial photograph identified by MEDEP, a berm-like feature appears to have been located on the site, indicating that munitions-related activities were occurring as early as 1978. Officially beginning in 1981, the site was used for disposal of small quantities of ordnance, pyrotechnics, privately manufactured explosives, and war souvenirs. Use of the range was officially terminated on 1 June 2004.

An as-built construction drawing of the Site 12 EOD Area, dated 21 July 1981 indicated an access road entering from the west, a central berm, and a shelter for observing detonations. A radius of 500 feet (ft) around the central berm was cleared of trees during the construction of the site. A note on the figure indicates that a swamp located on the eastern side of the site (in the current location of the Pond) was filled with stumps and dirt from the site clearance. These EOD area and pond area features still exist.

The site currently has a 5- to-6-ft-tall, three-sided earthen berm area approximately 60 ft long by 100 ft wide that occupies approximately one-half of the area suspected of being a former sand/gravel pit. A dumpster within the berm area, historically used for flashing small quantities of explosives and/or propellants such as grenade fuzes, was removed from the site in the 1990s. One control bunker, located approximately 200 ft southwest of the current earthen berm, was occupied by military personnel during detonation of explosive charges.

#### 10.2.3 Site Layout

Site 12 is approximately 24 acres in size and is bounded by an 8-ft-high chain-link and barb-wire fence, which was installed for land use control (LUC) in 2012. See Appendix A, Figure 2 (Site 12 EOD Area Site Map). The historical EOD berm area with one remaining berm is centrally located. This berm area is approximately 2 acres and is defined as Decision Unit 2 (DU-2). The Site 12 Pond Area, which was previously identified as DU-5, is located east of the berm area. The pond itself is approximately 1.5 acres. DU-2 and the actual pond area of DU-5 will not be investigated under this RI. The berm area



is under separate contract with the Navy to undergo a sifting operation for removal of MEC. The pond is currently being surveyed under this USA CTO, but will undergo a removal action under a separate work plan.

#### 10.2.4 Site Structures

The Site 12 EOD Area includes one former control bunker located approximately 200 ft southwest of the existing berm, in the center of the driveway loop. No other structures exist at the site.

#### 10.2.5 Site Boundaries

The following areas are in reference to the existing LUC fence:

- North: Marine Corps Armed Forces Reserve Center
- South: Undeveloped land (pine forest), Buttermilk Mountain
- East: Undeveloped land leading to the Buttermilk Cove waterway (approximately 1,300 ft from the site boundary)
- West: Access road from the NAS and undeveloped land (pine forest).

#### 10.2.6 Site Security

The former NAS is no longer secured and is open to the public. However, access gates on the existing LUC fence for Site 12 are kept padlocked. Access is authorized through the Navy Caretaker's office. Additionally, personnel from the Marine Corps Armed Forces Reserve Center periodically patrol the area.

### 10.3 Previous Studies of Extent of MEC Contamination

#### 10.3.1 Supplemental Feasibility Study Report (E. C. Jordan Company, 1991)

During a 1989 investigation of the Site 12 EOD Area, what appeared to be two small demolition craters and a dumpster were present within the existing berm area at the site. According to the study, six burns were conducted as training exercises at the site to destroy ordnance and explosives between 1984 and 1989.

To clear the site for exploratory work, surface and subsurface surveys were conducted by EOD-certified personnel in 1990, including a detailed inspection of the EOD training area and adjacent terrain (inside and outside of the current berm area). Subsurface clearance at sample locations was conducted using a Forester MK-26 Ordnance Locator. The berm area was confirmed to contain MEC. After clearing the site, three test pits approximately 20 ft apart were excavated. During the excavations, an expended solid rocket-fuel booster ("JATO" bottle) was unearthed. Other similar devices were observed just outside the berm area.

#### 10.3.2 PA Addendum (Malcolm Pirnie, July 2007)

This PA addendum summarized the history of munitions use and provided the results of a visual survey, assessment of current conditions, and Conceptual Site Model (CSM). The PA Addendum concluded that the entire Site 12 EOD Area was an area suspected to contain MEC and Munitions Constituents (MC) and recommended an SI to determine the presence or absence of MEC and MC at the site. Based on information obtained during the PA Addendum data collection process, the Site 12 EOD Area was not suspected to contain chemical warfare materiel (CWM)-filled munitions or hazardous, toxic, or radiological waste (HTRW) associated munitions.

### 10.3.3 Site Inspection (SI) Report (Tetra Tech NUS, Inc., 2009)

SI field work was conducted at the Site 12 EOD Area in July and August 2008. The SI confirmed historical and visual evidence that MEC is present at the site inside and outside of the historical and existing berm area. Suspect MEC items observed on the ground surface in and near the detonation area included two smoke grenades, one cartridge case, and an unknown ordnance-related item (suspected to possibly be a JATO M8 rocket motor) that was found just outside of the berm area. A gator mine was found during a detector-aided surface sweep of one transect outside of the berm area (and within the perimeter road) to the northwest. Two MPPEH items and a rocket motor were also observed during the detector-aided surface sweep along with several areas of significantly elevated magnetic influence (response from the metal detector which showed the presence of anomalies in the subsurface which could be metallic items) outside of the berm area and within the perimeter road. Anomaly density around the berms was determined to be moderate to high during geophysical surveying and more extensive than anticipated. Several large high-amplitude anomalies were detected outside of the existing and historical berms and at the edges of the SI geophysical survey boundary. Areas with several anomalies located within close proximity of one another and also areas of general elevated response were identified during the subsurface geophysical survey. However, without intrusive investigation, the reason cannot be determined. It may be that additional bermed areas were historically present and/or that the survey area was disturbed when historical berms were knocked down at the end of their use. The SI recommended clearance of surface MEC, MPPEH, and non-MEC materials during a removal action based on the pending 2010 construction of the Marine Corps Armed Forces Reserve Center and to facilitate further subsurface investigation for MEC during a subsequent Remedial Investigation (RI). Trenching activities were also recommended at locations where targeted subsurface anomalies were identified during the SI geophysical survey to verify the nature and type of subsurface MEC, MPPEH, and non-MEC materials, soil characteristics, depth of burial, and general depths to bedrock and/or groundwater.

### 10.3.4 Site 12 EOD Area TCRA Report (Tetra Tech, 2011)

The Site 12 EOD Area TCRA conducted in the summer of 2010 confirmed the presence of and addressed MEC/MPPEH encountered on the ground surface and in the subsurface. The work was designated as a TCRA, because of the need to clear any potential surface hazards for construction of the near-by Marine Corps Armed Forces Reserve Center. A detector-aided surface survey/clearance was performed over the Site 12 EOD Area in all accessible areas within the perimeter road except the pond, designated wetlands, and a steep rocky slope because the extensive work at the pond was not in the scope of work, and the wetlands and steep rocky slope were excluded based on environmental concerns and safety reasons. MEC/MPPEH items identified on the ground are listed below.

Trenching in and around the central area of the site near the existing historical berms (1981 and 1993) which targeted subsurface anomalies identified during the 2008 SI geophysical investigation identified the MEC/MPPEH, listed in Subsection 10.4.

The Site 12 EOD Area TCRA in 2011 (Tetra Tech) was carried out to visually investigate and/or conduct detector-aided investigation of the previously uninvestigated areas within the perimeter road of the Site 12 EOD Area for MEC/MPPEH characterization and surface clearance. These areas included the designated wetlands and the steep rock slope. Additionally, a non-munitions debris pile area north of the perimeter road was investigated. No additional munitions-related items (MEC/MPPEH) were discovered during this investigation.

### 10.3.5 Site 12 RI Report (Tetra Tech, June 2013)

An RI was conducted at Site 12 in 2012 to determine the nature and extent of munitions constituents (MC) and hazardous constituents, and to estimate associated human health and ecological risks. This study included a groundwater and geophysical survey, characterization and sampling of soils and pond

sediments, and surface water sampling. This worksheet includes the geological and hydrogeological results, which represent the most relevant and applicable data available.

In general, the RI concluded that elevated concentrations chemical compounds present at site 12 are unlikely. Additional Sampling is however, planned at site 12 during the Fall of 2013 to further evaluate chromium concentrations in soils. .

The analysis of the report as it relates to MEC is as follows: During the previously accomplished TCRA, munitions items were removed from the surface to clear any potential hazards for construction of the Marine Corps Armed Forces Reserve Center. This removed the surface hazard at the site; however, MEC potentially remains in subsurface soil, particularly in the overall existing/historical berm area. Further risk management approaches will be developed to address potential MEC/MPPEH in subsurface soil.

## **10.4 Munitions Release Profile**

### **10.4.1 Munitions Types**

Anecdotal evidence from the previous investigations indicates the types of munitions potentially present include ordnance, pyrotechnics, privately manufactured explosive devices, and war souvenirs. A complete list of these items, along with other site uses, can be found in Appendix D of the Preliminary Assessment (Malcolm Pirnie, 2006). The Site Inspection (SI) (on the ground surface) revealed two smoke grenades, one unidentified munitions-related item that could be a jet assisted take off (JATO) M8 rocket motor, one 3-inch cartridge case, one 2.2-inch rocket motor (munitions debris), and one gator mine.

The following MEC/MPPEH items were identified during the TCRA detector-aided surface survey and subsequently treated via donor charge:

- Inert 500-pound Mk82 bomb with Mk31 Safety Device in fuze well
- Multiple fuzes (unknown types) and components
- 40 millimeter (mm) cartridge cases with live primers
- 40mm practice grenade
- M-18 smoke grenades with and without fuzes
- 60mm mortar, empty
- Bulk propellant filler exposed in an unknown rocket type
- 20mm projectiles with and without fuzes
- M904 bomb nose fuze
- 75mm projectile base
- ANMk228 tail fuze, fully loaded
- Gator mine (labeled inert).

MEC/MPPEH items identified and treated during the subsurface trenching survey included the following:

- Unknown fuzes
- Small amount of bulk high explosives (HE).

During the surface and subsurface survey, numerous items were identified that were subsequently determined to be material documented as safe (MDAS); these MDAS items were then segregated for demilitarization. In 3 of the 12 trenches (Trenches 7, 8, and 10), items that were determined to be MDAS were discovered within a historical berm area. In the other trenches, only non-munitions debris was encountered.

MDAS items identified during the UXO detector-aided surface survey included the following:

- 2.25-inch sub-caliber aircraft rocket (SCAR) warhead (solid steel)
- 81mm practice mortar, empty and unfuzed
- 75mm projectile base, empty

MDAS items identified during the trenching survey included the following:

- 75mm projectile base
- Various munitions-related fragments and scrap
- Ballistic shield
- 40mm cartridge base
- Ejection cartridge base
- 37mm cartridge base
- 2.5-inch rocket motor
- Rocket motor venture
- 2.25-inch SCAR solid steel warhead
- 2.75-inch rocket venturi
- Rotating band (5 in.)
- Mk34 torpedo
- Unknown fuzes.

#### 10.4.2 Maximum Probability Penetration Depth

Military EOD personnel destroyed the munitions using explosives. They were not fired. Because none of the munitions were fired at the site, the maximum probability penetration depth is approximately 1 ft below ground surface (bgs) in the outer reaches of the site for kick-outs from the detonations and 4 ft bgs within the existing and historical berm areas, considering that munitions would have been buried prior to treatment via detonation. It is also possible that MEC/MPPEH were disposed of at the pond on the eastern edge of the site or at other unknown locations. No historical records indicating disposal in the pond or other areas have been identified.

#### 10.4.3 MEC Concentration

The probability of MEC is expected to be high within the existing and historical earthen berm areas, which are not included as part of this RI. The probability of encountering MEC outside of the berm area but inside the perimeter road is moderate, due to possible kick-out from operations or training activities. This assumption is further supported by the surface clearance conducted during the SI and TCRA. During the 2010-2011 TCRA, items were primarily found in the central portion of Site 12 near the current berm area in surface and subsurface soil, although several training items and kick-outs were found on the ground surface in the outer area of the site. It is anticipated that at some point within the site boundary, the probability becomes low as the distance from the berm area increases. There is also a potential to discover buried munitions materials or other debris within the Site 12 boundary south and west of the pond and even within the pond. It is less likely that the remaining wooded area east of the pond would have been used as a disposal area.

#### 10.4.4 Associated MC

Potential associated MC are metals (lead, antimony, copper, and zinc), explosives 2,4,6-trinitrotoluene (TNT), research department explosive (RDX), high molecular weight RDX (HMX), nitroglycerin,

black powder, white phosphorus, red phosphorus, tetryl), and perchlorate. MC are expected to be found in a similar pattern as the MEC/MPPEH, with the possibility of elevated concentrations within the historical berm area, which is excluded from this RI. In the outer areas of the site, MC are expected to be limited to surface soil, and concentrations are expected to be lower and more sporadic from kick-outs, considering explosives constituents are typically consumed during detonation. No appreciable concentrations of MC are anticipated. This is further substantiated by the results of soil sampling conducted during the 2012 RI. Based on the HHRA, no COCs retained for soil and concentrations for sediment and surface water were not at levels of concern.

#### 10.4.5 Associated Hazardous Waste Constituents

Hazardous waste constituents are not anticipated because only construction debris was found at Site 12 to date. Although two 55-gallon drums were identified on site, there were no indications of any associated hazardous constituents present.

#### 10.4.6 Migration Routes/Release Mechanisms

Potential MEC migration routes include migration of MEC from subsurface soil to the surface via erosion or frost heave around the existing/historical berms. Potential MC may be released from former surface items or munitions items remaining in the subsurface; migration routes include leaching of MC from soil (surface and subsurface) into groundwater, and runoff of contaminants from surface soil to the pond.

### 10.5 Physical Profile

#### 10.5.1 Climate

Maine is divided into three climatological divisions: Coastal, Southern Interior, and Northern Interior. Brunswick is within the Coastal Division, which extends for about twenty miles inland along the length of the coast, is tempered by the ocean, resulting in lower summer and higher winter temperatures than are typical of interior zones. Average high temperatures of 70 degrees Fahrenheit (°F) occur in July. The coldest temperatures occur in January (21 °F or lower).

#### 10.5.2 Topography

The southern half of Site 12 is relatively flat. The northern half of the site, which is marked by undulating hills, is approximately 10 ft higher in elevation than the southern half.

#### 10.5.3 Geology (June 2013 RI Report)

The geology of the site was first evaluated based on information from three test pits excavated within the current berm area during 1991. In two of the test pits, bedrock (micaceous schist) was encountered at 3 ft bgs underlying fill or disturbed soil over 1 to 2 ft of very dense till. The third test pit had 2 ft of fill or disturbed soil overlying desiccated, very stiff, gray silty clay, and bedrock was not encountered. Subsequently, bedrock was encountered at approximately 2 to 4 ft during 2010 TCRA trenching activities.

During the 2012 MC RI effort, site geology was observed to consist of varying quantities of fine to medium sand, silt, and gravel with some coal and asphalt (interpreted as reworked surface soil with fill), underlain by silt/clay (Presumpscot Clay) and schist bedrock (Cape Elizabeth Formation). These three units were observed in the three borings advanced during monitoring well installation. Coal fragments and asphalt observed in soil borings were indicative of minor fill material. Surface materials consisted of approximately 3 to 6 in. of topsoil and 6 in. to 2.5 ft of reworked surface soil with fill underlain by clay with varying amounts of silt (interpreted as the Presumpscot Clay) that ranged from approximately 3 to 9

ft thick. Sea shells were observed in the clay at one location (SB-12-01). The 2 ft of clay overlying bedrock was described as dry in the three borings. Schist bedrock was encountered at depths ranging from approximately 4 to 10 ft bgs, underlying the Presumpscot Clay, in the three monitoring well borings. Bedrock observed in cores was composed of muscovite and biotite schist with a foliation angle of approximately 70°, consistent with the schistosity measurements of 54° to 90° in surface exposures determined during the fracture trace analysis. The primary fracturing and jointing observed in bedrock at Site 12 EOD Area primarily has a north-northeast strike and east-southeast dip (schistosity/foliation). East of DU2, bedrock crops out along the perimeter road, and closer to the pond, bedrock was encountered at 1.1 to 2.2 ft bgs in two lithology soil borings. Depth to bedrock below the pond was estimated at approximately 4.5 ft bgs.

#### 10.5.4 Hydrogeology & Hydrology (June 2013 RI Report)

The closest private drinking water wells are approximately 2,000 ft east of the site along Coombs Road.

The elevation of the groundwater potentiometric surface within the overall existing/historical berm area varied from 0.63 ft above ground surface (75.57 ft above mean sea level at MW-12-01 northwest of the berm area and adjacent to the small wetland area) to 2.92 ft bgs (76.30 ft above mean sea level at MW-12-03 east of the berm area). Groundwater flow at the site is toward the northwest with a horizontal gradient of 0.0048. The surface water elevation at the pond staff gauge was 76.65 ft above mean sea level, higher than elevations in site monitoring wells.

Groundwater elevations suggest that groundwater is generally confined in bedrock within the berm area. Observations on boring logs note that the reworked soil/fill material (0 to 3 ft bgs) was moist to wet but that the top 2.5 ft of clay in the borings was dry, suggesting low permeability and potentially low hydraulic connectivity between the reworked soil/fill overburden and bedrock. The surface water elevation measured at the pond staff gauge was calculated at 76.65 ft NAVD 88; this elevation was higher than the elevations measured in the monitoring wells and may be the result of perched conditions based on organic material and finer-grained material (silts and silts with sand) identified along the pond bottom. Discharge from the pond occurs to the south.

The topographic high of bedrock in the northwestern part of Site 12 likely causes surface runoff and shallow groundwater to flow from the topographic high to the southeast toward the wetland area, restricting groundwater flow from the bermed areas. Topographically on the eastern portion of the site, the bedrock outcrop east of the Perimeter Road appears to be a divide for overland flow and shallow perched groundwater flow in the reworked soil/fill material. The westerly dip of the clay observed is consistent with the observed surface drainage patterns toward the wetland area in the central portion of the site. However, the bedrock exposures along both the eastern and western shores of the pond and the shallow water depth suggest that the pond is hydraulically connected to bedrock, but the fine-grained sediment in the pond may limit movement of water from the pond to groundwater.

#### 10.5.5 Vegetation

Vegetation at the site consisted of tall grasses within the perimeter road (cut during the 2010 TCRA activities), wetland areas, and maple and pine trees in the surrounding area.

### 10.6 Land Use and Exposure Profile

#### 10.6.1 Current Land Use

The site is inactive, and fenced in. The Marine Corps Reserve Center utilizes the areas surrounding the site.

#### 10.6.2 Current Human Receptors

Potential receptors include Navy and Marine Corps personnel, civilian personnel inspecting the site, contractors performing investigations on site, and visitors and trespassers.

#### 10.6.3 Potential Future Land Use

Potential future land use is anticipated as the Brunswick Naval Air Station (BNAS) Conservation District (Natural Area). The long term goal is to transfer this property to the Town as a natural area which allows for pedestrian trails, nature and interpretive centers, summer camps, environmental education and other non-intrusive recreational and educational uses.

#### 10.6.4 Potential Future Human Receptors

Potential future human receptors may include personnel/visitors to the Marine Corps Armed Forces Reserve Center as well as park personnel and recreational users. Additionally human receptors could include future construction, maintenance, site occupational workers, trespassers, and hypothetical future residents. Human receptors may come into direct contact with MEC in the subsurface (surface was cleared during TCRA) and/or MC in surface or subsurface soil (contractors). Note that although currently the ground surface has been cleared of MEC/MPPEH, over time subsurface munitions-related items, MEC, or MPPEH may migrate to the surface through erosional processes or frost heave.

#### 10.6.5 Zoning/Land Use Restrictions

Land use restrictions for excavation and groundwater use have been voluntarily enacted by the base and were in place until base closure on 30 May 2011. In February 2012, the Navy determined a Land Use Control (LUC) fence was needed around the western and northern side of Site 12, which would join existing fencing to the south and east to completely enclose the site. This fencing was completed in June 2012.

#### 10.6.6 Beneficial Resources

There are no beneficial resources on the Site 12 EOD Area.

### 10.7 Ecological Profile

#### 10.7.1 Habitat Type

The site habitat is a tall grass. Maple and pine forest surround the area. Wetlands are located across the central portion of the site. A pond is located on the eastern side of the site; wetlands surround this pond.

#### 10.7.2 Degree of Disturbance

The degree of disturbance at the site is low; the site is currently unused. The habitat and species at the site are undisturbed and will likely remain so.

#### 10.7.3 Ecological Receptors and Species of Special Concern

Potential ecological receptors include mice, shrews, voles, rabbits, fox, squirrels, deer, hawks, and occasionally moose. NAS Brunswick also attracts a wide variety of avian species including owls, woodpeckers, and numerous passerine and falconiform species. No species of special concern are known to inhabit the site. In conjunction with the Site 12 Pond investigation effort, a natural resource assessment is being conducted from the spring through the early fall of 2013, which will document all observable plant and animal species. Results of the first two phases of the assessment indicate that no special species inhabit the site.

#### 10.7.4 Relationship of MEC/MC Sources to Habitat and Potential Receptors

The ground surface of the Site 12 EOD Area was cleared of munitions-related items during the 2012 TCRA. Receptors may come into direct contact with MEC/MC in subsurface soil, while burrowing.

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## **11.0 QAPP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statements**

### **WHO WILL USE THE DATA?**

The data generated by the RI will be used by the Department of the Navy, NAVFAC MIDLANT and project stakeholders.

### **WHAT ARE THE PROJECT ACTION LIMITS?**

As shown on **Figure 2**, approximately 17 acres is to be investigated utilizing Digital Geophysical Mapping (DGM) followed by intrusive investigation of a statistically determined number of metallic anomalies. The remaining area, except for the 2 acre berm area, will be investigated using traditional analog detection and dig methods. Regarding the wooded areas; there is a concern that the analog detection process may expose a high density of cultural debris. In this case the Navy may opt to subdivide the 100 foot grids into 50 foot grids and investigate only a portion of the smaller grids (e.g. investigate every other grid).

Discovery of MPPEH/MEC items within the Site 12 investigation area confirms the presence and nature of the MEC. The type and location of these items may necessitate investigation of additional DGM targets and/or step-outs beyond the current LUC boundary in order to determine/redefine the extent of the potential MEC hazard.

Descriptions of other debris and items of interest that may be discovered will be recorded. If deemed necessary by the Project Delivery Team (PDT), an initial investigation of items of environmental concern will be conducted. The PDT is comprised of the USA/Parsons team, the Navy and regulatory stakeholders (i.e., USEPA and MEDEP). MC sampling will be conducted in accordance with the “Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Munitions Constituents Remedial Investigation of Site 12 EOD Area, Former Naval Air Station Brunswick,” prepared by Tetra Tech and dated 10/1/2012. This document will subsequently be referred to as the Site 12 MC SAP (Tetra Tech, 2012). In the event that composite sampling is performed, a SOP describing the sampling procedure will be provided to the PDT prior to sampling

A description of the PALs is also provided in Worksheet #15.

### **WHAT WILL THE DATA BE USED FOR?**

The RI data will be used to:

- Determine the nature and extent of the MEC hazard as it relates to distance from the historical EOD berm area. If required, boundary step-outs are to be established by the PDT to determine the horizontal extent of MEC contamination. Step out investigations may be performed at a later date. The current Explosives Safety Submission (ESS) allows for investigation within the existing LUC boundary. Stepping out requires an amendment to the ESS.
- Characterization of other debris and items of interest discovered will be used to supplement further decisions regarding future remediation and/or LUCs.

- Determine whether further action is required and whether all or portions of the MRS may proceed toward property transfer with minimal possible land use restrictions.

### **WHAT TYPE OF DATA IS NEEDED?**

The following type of data is to be obtained during the RI:

- Locations of MPPEH and MEC items found during analog detect and dig operations - [recorded with personal digital assistant (PDA)], and notated on a project map.
- Digital geophysical data, including data to support the geophysical system verification (GSV) process, to identify subsurface geophysical anomalies that may indicate the presence of MEC for intrusive target locations. Refer to Appendix D, Supplemental Information for an explanation of the GSV process.
- Composite DGM target map showing the intensity of the instrument response on a pseudo-color scale. The map will display all targets above the selected electromagnetic response threshold as a color vs. a gray scale. Refer to Section 17.6.1 for explanation of how the response threshold relates to anomaly selection.
- DGM data for anomaly locations and intrusive target locations (i.e. dig list).
- Intrusive Investigation data: Identification of MPPEH, MEC, and other items found by DGM target identification
- Digital photographic record of all MPPEH and MEC items found
- Identification of MPPEH and MEC items found
  - Type of MEC (nature)
  - Vertical and horizontal extents
  - Condition: MC soil sampling will be conducted if breached munitions, discolored soil or unusual odors are detected during intrusive investigations. Soil samples will be taken to determine if explosives are present. If explosives are detected above the screening criteria, soil removal will be completed in accordance with the 2012 Site 12 SAP.
- Identification of other items found
  - Type of item/s
  - Vertical and horizontal extents (i.e. a disposal area for construction debris or other types of materials)
  - Notes of environmental interest. Procedures for potential environmental contaminants are described in WS#17.
- QC data pertaining to both digital and analog geophysical surveys, to the intrusive investigation, and to sample collection and analysis (if necessary), to document the effectiveness of the MEC removal.
- QC data for the instruments utilized [Geophysical System Verification (GSV), including Instrument Verification Strip (IVS) and Blind Seed program]
- Recommended further action.

## **HOW “GOOD” DO THE DATA NEED TO BE IN ORDER TO SUPPORT THE ENVIRONMENTAL DECISION?**

The data need to be of sufficient quality to support the DQOs and enable effective comparison of remedial alternatives:

- All data collected during this MEC removal project are required to attain the measurement performance criteria described on Worksheet #12 to be considered adequate to support environmental decisions, unless sufficient alternative justification is provided to and accepted by the project team.
- Identification of subsurface anomalies investigated to the depth of instrument detection
- Reacquisition target coordinate data to be accurate to within  $\pm 0.5$  ft
- Accurate intrusive investigation data for 100% of the selected anomalies
- MEC disposition data for 100% of MEC or MPPEH recovered during intrusive investigations
- Accurate certification of all MPPEH that is determined to be Material Documented As Safe (MDAS).

## **HOW MUCH DATA ARE NEEDED?**

The number of DGM targets to be investigated will be developed by dividing the DGM areas of investigation into DUs and using statistical methods along with limited manual selection to identify the number of anomalies per DU to investigate. The MRS will be broken into DUs for this purpose after reviewing the DGM mosaic showing all target anomalies. DU boundaries will be based on the density of anomalies relative to the EOD berm area and the current MRS boundary. In order to obtain adequate data for the DGM, the Army Corps QC performance requirements Table 11-1 will be utilized to establish a confidence level for the RI and keep the number of digs reasonable. Based on this draft guidance the RIFS default sample lot sizes where no MEC has actually been located is (90% confidence that <5% is unresolved (i.e. If no MEC is identified in the selected samples, there is 95% confidence that the area or DU has no MEC). The formula used to generate this table is embedded in VSP. Therefore, based on this table, each DU will have between 27 and 45 anomalies selected for investigation.

The proposed DUs and a list of statistically based DGM targets, along with other targets of interest, will be presented to the Navy for review with the PDT. PDT input will be considered in finalizing the DUs and dig list.

**Table 11-1: Acceptance Sampling Table for Anomaly Resolution**

	<b>Lot Size = 50 Anomalies</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>	<b>2000</b>	<b>5000</b>	<b>10,000</b>
70% confidence < 10% unresolved <sup>1</sup>	11	11	12	12	12	12	12	12
80% confidence < 10% unresolved	14	15	15	16	16	16	16	16
90% confidence < 10% unresolved	18	20	21	22	22	22	22	22
95% confidence < 10% unresolved	22	25	27	28	29	29	29	29
70% confidence < 5% unresolved	17	21	23	23	24	24	24	24
80% confidence < 5% unresolved	21	27	30	31	31	32	32	32
85% confidence < 5% unresolved	23	31	34	36	37	37	37	37
90% confidence < 5% unresolved <sup>2</sup>	27	37	41	43	44	45	45	45
95% confidence < 5% unresolved	31	45	51	56	57	58	59	59
80% confidence < 1% unresolved	40	80	111	138	144	154	158	159
85% confidence < 1% unresolved	43	85	123	158	172	181	186	187
90% confidence < 1% unresolved <sup>3</sup>	45	90	137	184	205	217	224	227
95% confidence < 1% unresolved	48	95	155	225	258	277	290	294

\*Gray boxes show number of dug locations to check post-excavation. All must be shown to be resolved to meet confidence values (accept on zero).

In addition to the anomalies selected based on the statistical method, anomalies of interest will be manually selected and included on the dig list. An example of this would be for a broad area response referred to as a DGM polygon, that is indicative of buried debris. These areas should be investigated fully or in part to determine the nature of the material and to assess the likelihood that it contains MPPEH.

## **WHERE, WHEN, AND HOW SHOULD THE DATA BE COLLECTED/GENERATED?**

### **Where?**

The project data will be collected at Site 12 at former NASB in Brunswick, Maine.

<sup>1</sup> Default for RIFS where MEC has been recovered.

<sup>2</sup> Default for RFS where no MEC has been recovered.

<sup>3</sup> Default for Removal Action.

### When?

The schedule for the MEC removal, including the planned period for the field operations, is included on Worksheet #16. All data will be gathered during the period of field operations.

### How?

Data will be collected by and generated IAW the field and analytical SOPs contained in this UFP-QAPP (Worksheet #21 and Worksheet #23).

The data will be obtained during the single mobilization to perform the RI at the MRSs. Data collection and generation is summarized in Table 11-2.

**Table 11-2: Methods of Obtaining Data**

<b>Data Type</b>	<b>Where</b>	<b>When</b>	<b>How</b>
DGM data	Data will be collected in all accessible areas as represented in Figure 2. Actual accessible areas will be determined based on site conditions after vegetation removal.	Data will be recorded digitally at the time of geophysical mapping.	Data will be digitally recorded using the data logger that is part of the EM 61 Mk 2 system.
Analog, detect and dig data	Portions of MRS that remain inaccessible to DGM and are safe to manually investigate, primarily the heavily wooded areas. The PDT may elect to break the wooded area into smaller grids and investigate a portion of the grids.	The manual investigation of pre-determined non-DGM areas may be conducted at any time, independent of the DGM work. However, final determination of all areas requiring manual investigation will be made after vegetation removal and confirmation of the DGM coverage areas.  Also, after beginning work in the wooded area, production will be reviewed to decide whether to continue with full clearance or to adjust and clear select smaller grids.	UXO teams will use the analog sensor, demonstrated at the IVS, to locate subsurface anomalies for intrusive investigation. Intrusive data is recorded daily on grid sheets and accumulated on an intrusive investigation log.
Target coordinate data from reacquisition	Data will be collected at each target coordinate position after repositioning.	Data will be recorded after the suspected anomaly source is pin-pointed using a hand held metal detector.	Data will be electronically recorded using the data logger that goes with the RTK DGPS equipment.
Intrusive investigation data	Data will be collected at the point of investigation.	Data will be recorded at the time of intrusive investigation for each target anomaly.	Data will be recorded by hand onto the UXO team dig sheet or in electronic data logger.

<b>Data Type</b>	<b>Where</b>	<b>When</b>	<b>How</b>
Analog and Dig Investigation Data (Munitions and Non-Munitions items)	Data will be notated on the grid sheets in the field. MEC and MPPEH data will also be entered in the electronic data logger.	Data will be recorded throughout each day as grid clearance progresses. MEC and MPPEH will be logged by the SUXOS upon inspection of the item.	Data will be recorded by hand onto the UXO team dig sheet or in electronic data logger.
Munitions constituents sampling	Data will be collected at the point of investigation.	Samples will be taken where discolored soil or unusual odors are discovered.	Soil sampling will be conducted in accordance with the Site 12 SAP previously prepared by Tetra Tech.
MEC Disposition Data	Data will be collected at the point of disposal (e.g., either the MEC consolidation and demolition area or the target location if a blow in place [BIP] is required).	Data will be recorded at the time of disposal.	Data will be recorded by hand onto the MEC Disposal Form or in electronic data logger.
MPPEH Disposition Data	Data will be collected at the point of recovery.	Data will be recorded at the time of intrusive investigation for each target anomaly.	Data will be recorded by hand onto the UXO team dig sheet or in electronic data logger.
MDAS Disposition Data	Data will be collected at the point of disposal (e.g., when transferred to a scrap dealer or when delivered to a qualified recycler for demilitarization).	Data will be recorded at the time of transfer of the material.	Transfer of custody of the material will occur using a Department of Defense (DoD) Form 1348-1.
Photographic Data	Photos will be taken of MEC, inaccessible areas and other items or areas which may be of interest.	Photos will be taken at the time of discovery.	Digital photos will be taken and a photo log will be maintained.

## **WHO WILL COLLECT AND GENERATE THE DATA?**

The USA Team will collect and generate all field data, including data concerning geophysical surveys, intrusive investigations, and sample collection. Additional information on project personnel is provided on Worksheet #5 and Worksheet #7.

- The DGM team will collect DGM data at the IVS and the site, as well as process, analyze, and provide the DGM results for incorporation into the project GIS.
- DGM target coordinates using the Real Time Kinematic Differential Global Positioning System (RTK DGPS) and reacquisition repositioning data are logged using an RTK DGPS base station and rover units by the Reacquisition Team for incorporation into the project GIS.
- The UXO team leader will generate any required data from the analog and dig operations.
- Preliminary MEC/MPPEH identification is made by the UXO Technician II and then verified by the UXO Technician III Team Leader. MEC and MPPEH identification is verified by the Senior Unexploded Ordnance Supervisor (SUXOS). Other data necessary to characterize anomalies will be collected and reported to assess the nature of subsurface materials. This may include items such as pipes, construction debris, wires, etc.

The contractor's GIS group manages field data, including project status, DGM results, and all intrusive results, and generates all project maps.

## **HOW WILL THE DATA BE REPORTED?**

The data will be reported in several formats, including:

- DGM data along with anomaly image, target maps and proposed dig lists
- DGM target dig results describing all anomalies investigated
- DGM QC Summary Report
- Geophysical System Verification (GSV) Report
- GIS database
- PDT notification by phone and e-mail of significant discoveries, such as finding a MEC/MPPEH item that exceeds the limitations of the ESS, a drum with contents, or other obvious and significant contamination of the soil.
- Photographs of MEC/MPPEH items and other significant items of interest.
- Analog and dig investigation log
- Written daily field reports
- Weekly update of the intrusive results log
- Monthly status reports
- RI Report.

## **HOW WILL THE DATA BE ARCHIVED?**

Hardcopy reports will be stored in the appropriate project files at NAVFAC MIDLANT, as well as in the Administrative Record repository. Digital versions of the RI Work Plan, and Report will be electronically transferred into the Navy Electronic Data Deliverables/Navy Installation Restoration Information System (NEDD/NIRIS).



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## 12.0 QAPP Worksheet #12: Measurement Performance Criteria

Additional information to support and explain the DGM is provided in Appendix D, Supplemental Information.

Definable Feature of Work ----- Data Type	Geophysical Anomaly Measurement Data Quality Indicator	QC Sample and/or Activity to Assess Measurement Performance	Measurement Performance Criteria	Frequency
Site Preparation/Grid Layout ----- Positional Data	Accuracy	Geographic Information Systems (GIS) Manager or designee checks recorded coordinates of placed grid stakes against planned location	Positional error of grid stake does not exceed $\pm 15\text{cm}$	After Placement
MEC Avoidance ----- detection instrument function and Interference	Sensitivity	Operator checks instrument to confirm response to subsurface “industry standard objects” (ISOs) in analog test strip (function test)	Audible response to presence of subsurface metallic test item	Start of each survey day
	Accuracy/bias	UXOQCS or designee checks instrument operator for interfering metallic objects by scanning with instrument	No interfering metallic objects detected	Start of each survey day
DGM Surveys ----- along line measurement spacing	Completeness	DGM processor measure the spacing between data points in DGM data	98% of along line measurement spacings $\leq 0.25\text{m}$	Once per dataset
DGM Surveys ----- velocity	Precision	DGM processor evaluates velocity using Geosoft Velocity Calculation QC tool	$95\% \leq 3.4\text{ mph}$ (or maximum velocity demonstrated during IVS)	Once per dataset
DGM Surveys ----- coverage	Completeness	DGM processor evaluates coverage using Geosoft Coverage Calculation QC tool	>95% coverage at project design line spacing	Once per dataset
DGM Surveys ----- IVS data collection	Precision	DGM operator collects data over IVS with each instrument to be used	Measured responses are at least 75% of the initially recorded responses for items in IVS	Twice per day

<b>Definable Feature of Work</b> ----- <b>Data Type</b>	<b>Geophysical Anomaly Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Frequency</b>
DGM Surveys ----- GSV blind seeding	Accuracy	UXOQCS or designee places seeds in area(s) to be surveyed; GSV blind seeds will be small ISOs buried at 10cm bgs at a frequency such that 1 seed should be mapped per team per day <sup>(2)</sup> After survey, QC Geophysicist checks processed response and interpreted location of blind seed items	All blind coverage seeds detected with at least 75% of minimum expected response at maximum horizontal offset; <sup>p</sup> ositional accuracy of GSV seed within 85cm for data collected with RTK GPS positioning	Daily
DGM Data Processing and Anomaly Selection ----- target selection	Accuracy	QC Geophysicist confirms all anomalies meeting project requirements are selected and retained in the project's anomaly database	All anomalies meeting selection criteria have been selected	For each dataset
Analog Detect & Dig ----- Instrument Response	Sensitivity	Function check: Instrument checks to determine response of analog detector to metallic objects in the ITS	Positive response to presence of any anomaly to depth of instrument detection. The test will be conducted using industry standard metallic objects buried in an instrument verification strip (IVS).	Daily
Use of Field Instruments if Investigation of Item of Concern ----- Instrument Response	Sensitivity	Function check: Instrument checks utilizing calibration media provided with the equipment and in accordance with manufacturer's instructions.	Positive response to the control media within the allowable instrument error range, in accordance with the manufacturer's data.	Each occurrence or daily, whichever is less
Intrusive Operations ----- Anomaly Resolution Data	Accuracy	QC to sample identification of munitions-related anomaly sources	Type, condition, and fuzing state (no fuze, unarmed fuze, armed fuze) of munitions-related items correctly identified	Each Occurrence
	Accuracy	QC review of identification of blind seed item (BSI) location	100 percent of all BSIs installed by the UXOQCS will be removed and their location and depth accurately located to be within 1	At completion of grid

<b>Definable Feature of Work ----- Data Type</b>	<b>Geophysical Anomaly Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Frequency</b>
			foot.	
	Completeness	QC audit of anomaly identification data; QC of excavation following to ensure removal of targets to specific depth	Every target anomaly below ground surface (bgs) (has been resolved (anomalies below the specified limits will not be resolved).	At completion of grid
	Completeness	QC audit of anomaly identification forms (Daily Grid Tracking Logs – electronic)	Anomaly identification forms (electronic) are completely and correctly filled out for each anomaly.	Daily
	Completeness	QC audit of MEC accountability	100 percent of MEC items logged during the week are verified as BIP or otherwise stored or disposed of.	Weekly

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### 13.0 QAPP Worksheet #13: Secondary Data Criteria and Limitations Table

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data May Be Used (if deemed usable during data assessment stage)	Limitations on Data Use
Results of previous investigations	<i>Refer to WS#10, Sections 10.3 and 10.4.</i>	Refer to WS#10, Sections 10.3 and 10.4.	Information regarding the types and locations of munitions related items are used to indicate which areas are more likely to contain subsurface items. Previous listings and photos may assist in identification of materials discovered during the MEC subsurface RI.	Data is limited to the areas previously investigated, which are the surface areas west of the pond and surface and subsurface within the EOD berm area.

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#### 14.0 QAPP Worksheet #14: Summary of Project Definable Features of Work

Definable Feature of Work	Tasks
Mobilization/Site Preparation	<ul style="list-style-type: none"> <li>• Site Survey Control</li> <li>• DU-2 boundary staking. MRS boundary stakeout is not required, because the existing LUC fence is considered the boundary.</li> <li>• Vegetation Removal</li> <li>• IVS Preparation:               <ul style="list-style-type: none"> <li>- Installation</li> <li>- Execution</li> <li>- Report/Certification</li> </ul> </li> <li>• Surface Clearance of Metallic Objects in areas designated for DGM that have not previously undergone a surface clearance.</li> <li>• BSI Installation</li> </ul>
GIS Data Management	<ul style="list-style-type: none"> <li>• Establish GIS control points</li> <li>• Prepare maps and GIS for field use and final reports</li> <li>• Prepare GIS deliverable</li> </ul>
MEC Avoidance	<ul style="list-style-type: none"> <li>• Provide UXO-qualified personnel to escort non-UXO trained personnel while conducting tasks in potential MEC hazard areas</li> </ul>
DGM Surveys	<ul style="list-style-type: none"> <li>• Collect QC data associated with daily DGM surveys</li> <li>• Conduct 100% coverage DGM surveys across all areas accessible to DGM equipment.</li> </ul>
DGM Data Processing and Anomaly Selection	<ul style="list-style-type: none"> <li>• Process DGM data.</li> <li>• Propose the DUs based on the distribution of anomalies.</li> <li>• Generate a statistics-based dig list for each DU. Manually select and include other proposed targets of interest with the dig list.</li> <li>• Conduct QC evaluation of DGM data and submit to QA for target list concurrence; update dig list if necessary based on QA review</li> <li>• Provide the proposed DU map and dig lists to the Navy for PDT review and comment.</li> <li>• </li> </ul>
Target Reacquisition	<ul style="list-style-type: none"> <li>• RTK DGPS reacquisition operational checks</li> <li>• Reacquire Anomaly location with RTK DGPS and place a flag at the location with the target I.D. marked on the flag.</li> </ul>
Intrusive Investigation of Selected Anomalies (DGM Dig List)	<ul style="list-style-type: none"> <li>• EM61 and Hand-held Instrument Verification</li> <li>• Use EM61 to refine the anomaly location within 1.5 feet of the flag.</li> <li>• Use hand-held detectors while excavating target anomalies</li> <li>• Recover all BSIs included with the selected targets</li> </ul>



Definable Feature of Work	Tasks
	<ul style="list-style-type: none"> <li>Inspect and Classify Anomaly</li> <li>Clear Excavation with Hand-Held Detector</li> <li>Log intrusive results on PDA or similar electronic device &amp; Import to GIS</li> <li>Intrusive QC verification with EM61-MK2</li> <li>Backfill excavation unless anomaly is MPPEH or MEC to be left in place for treatment.</li> </ul>
Analog Instrument Detect and Dig of DGM Data Gaps and DGM inaccessible areas.	<ul style="list-style-type: none"> <li>Hand-held Instrument Verification</li> <li>Use roped search lanes for complete coverage using hand-held metal detectors.</li> <li>Dig and investigate all anomalies detected.</li> <li>Log results of munitions related items.</li> <li>Backfill excavation unless anomaly is MPPEH or MEC to be left in place for treatment.</li> </ul>
MEC & MPPEH Management	<ul style="list-style-type: none"> <li>Further Inspection and Classification of Anomalies</li> <li>Treatment of MEC or MPPEH by Demolition</li> <li>Documentation and Processing of MDAS</li> </ul>
Investigation of subsurface debris and Items of Environmental Concern	<ul style="list-style-type: none"> <li>Initial Encounter by UXO Team: Inspect and classify as obvious soil contamination, drum with contents, possible ACM, etc.</li> <li>SUXOS to verify the potential for concern, photo the item, and log the item and location in the data logger.</li> <li>Have UXO team continue work in a different location.</li> <li>SUXOS to contact the installation POC and USA PM.</li> <li>PDT Determines what procedures are to be taken for further investigation or sampling.</li> <li>Either re-cover the item with earth or investigate/conduct sampling as directed by the PDT.</li> </ul>
Disposal of Regulated Waste (Small Quantity)	<ul style="list-style-type: none"> <li>PDT to determine if disposal under this contract is warranted.</li> <li>Develop waste disposal requirements Follow waste disposal procedures.</li> <li>Generate appropriate waste disposal manifests and records.</li> </ul>

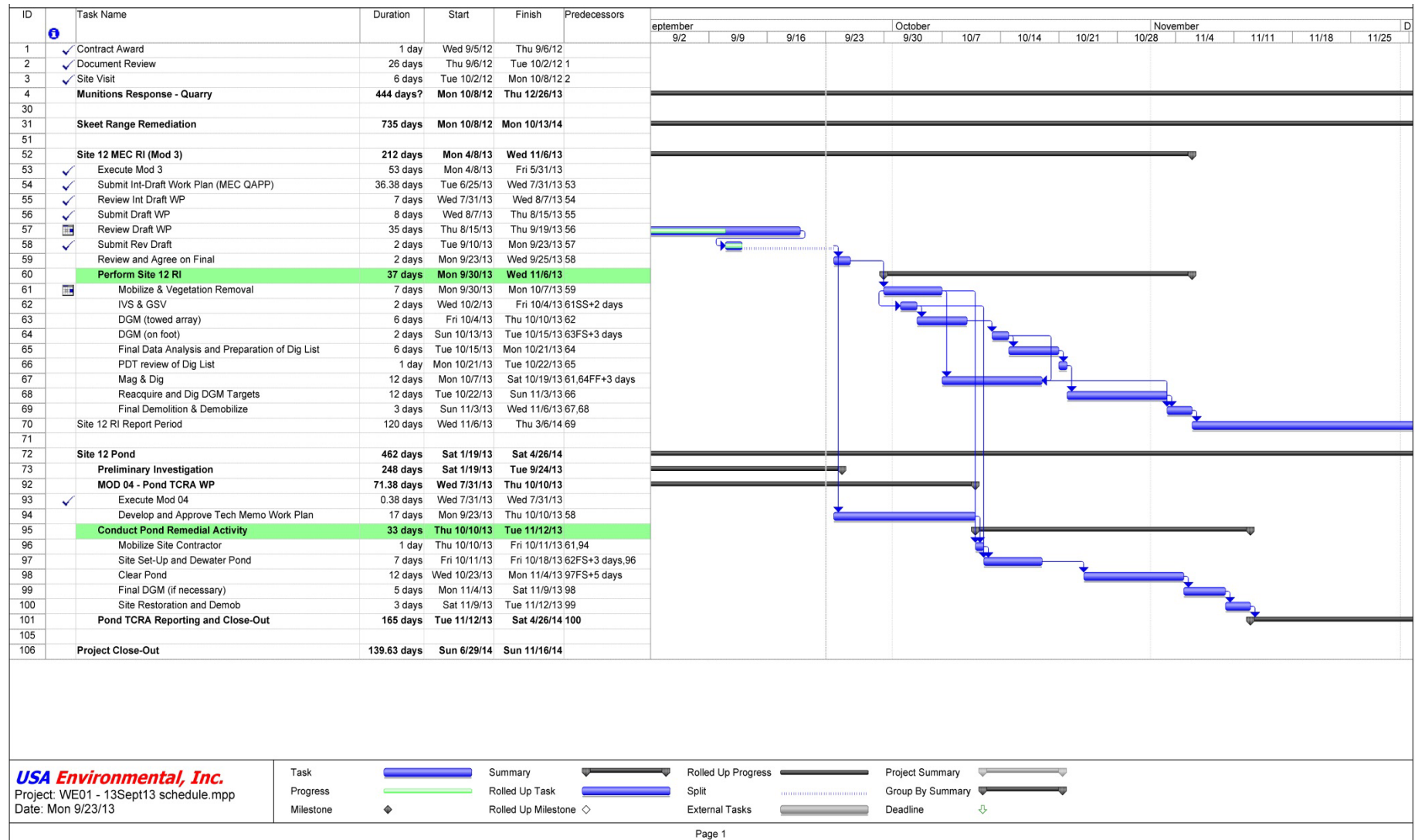
## 15.0 QAPP Worksheet #15: Reference Limits and Evaluation Tables

This table represents the MEC investigation. The Site 12 MC SAP (Tetra Tech, 2012) is to be referenced for soil as needed.

MEC Item	Project Action Limit	Project Action Limit Reference	Project Detection Limit Goal	Validated Detection Limits/Test Bed Validated Detection Capability
See Worksheet #10, Section 10.4 for listings of potential MEC items.	<p>Detection of any such MPPEH/MEC item during the Field Investigation of selected DGM anomalies confirms presence of MPPEH/MEC hazard. Further MEC sampling (step-outs) may be performed during the RI to determine the extent of the contamination.</p> <p>Detection of any such MPPEH/MEC item in any other area of study indicates an unacceptable MEC hazard. Discuss the location of the find with the RPM and determine what additional DGM anomalies or analog and dig step-outs are to be performed.</p>	This Anomaly Investigation DQO Process	<p>Detection limit goals are less applicable, because a limited number of DGM anomalies are to be selected for investigation.</p> <p>Depth of detection is limited to 11x the diameter of the object (as a rule of thumb).</p> <p>Munitions related items should not be located any deeper than this unless site grading activities or intentional burial has altered the depth.</p> <p>Determine horizontal extents of the Area of Concern (AOC) for each DU within the LUC boundary. Determine if there is a potential need to step out beyond the LUC boundary in any location. This may require more DGM targets to be investigated.</p>	100% inspection and positive identification of all anomalies selected for investigation.
MPPEH/MEC Item other than the listed suspect items	Detection of unlisted MEC items that pose a significant hazard requires a discussion with the Navy to discuss the nature of the item with relation to the historic EOD activities.	This Anomaly Investigation DQO Process	If fragmentation data for the subject item exceeds the limits of the approved ESS, work will be stopped until the Explosives Safety Submission (ESS) is corrected or amended.	100% inspection and positive identification of all anomalies investigated.

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## 16.0 QAPP Worksheet #16: Project Schedule/Timeline Table



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## **17.0 QAPP Worksheet #17: Sampling Design and Rationale**

This worksheet describes the project definable features of work (DFW) and related tasks that will be performed to meet the requirements and objectives of this project.

### **17.1 General Technical and Operational Approach**

The technical approach to the MEC remedial investigation at Site 12 follows a standard DGM investigation process which includes vegetation removal for surface preparation, GSV, DGM, data analysis, dig list development, investigation of target anomalies, disposal of MEC/DMM/MDAS or other anomaly source materials in compliance with Federal, state and local requirements, and restoration of the site to its prior condition. Areas (such as heavily wooded areas and steep slopes) that are not accessible to DGM equipment will be investigated using an analog instrument detection and dig procedure. Environmental sampling is not anticipated unless evidence of soil contamination or possible ACM is discovered. The DFWs are provided in Worksheet #14.

The Site Plan presented as Figure 2 in Appendix A shows the areas that are anticipated to be DGM accessible as well as the inaccessible areas. Approximately 17 acres of terrestrial area DGM is proposed, and 3.54 acres is proposed for analog detect and dig. In order to capture relevant and appropriate data, these DGM accessible areas are to receive 100% coverage. After DGM data is processed and an MRS map showing the anomalies is developed, the MRS will be divided into DU areas for statistically based selection of targets for intrusive investigation.

In addition to the random dig list developed from the statistical analysis, specific targets or areas of interest may also be selected for further investigation. An area exhibiting an EM response over a broad area could be a disposal location that should be investigated during the RI. Because this is an investigation, observations will be made and recorded for non-munitions related debris as well.

Metal detection will be performed using hand-held all metals detectors in areas inaccessible to DGM resulting in DGM data gaps as well as in the wooded areas where it was decided not to remove the trees to conduct DGM. Detected anomalies will be investigated at that time vs. flagging the locations for later investigation. This method results in conducting a removal action for these areas. Although the anomaly density is expected to be low, it will be more cost effective to dig each anomaly as it is detected than to collect the position data for all the flags and dig only a portion of the flags. In the event the amount of cultural or other debris is significantly higher than expected and results in excessive digging (low team production), the 100 foot grids will be subdivided in to 50 foot grids from which select specific grids for clearance (e.g., every other grid).

Wetlands are located within the MRS, as shown on Figure 2. A biological assessment of the pond area and wetlands delineation is being conducted through-out the 2013 growing season by the project team. The first two phases of this study are complete and results of the delineation are reflected in Figure 2. The third and final phase of the biological assessment is to be conducted September 2013, which will provide the biologists the opportunity to verify the wetlands boundaries based on the plant species observed at the end of the growing season. Vegetation within the wetlands will be cut for the RI. This project should result in minimal disturbance to the wetlands, and problems with regrowth the following spring are not anticipated. The PDT will discuss options if it becomes apparent that there will be a negative impact to the wetlands.

### **17.2 Safety Considerations & Exclusion Zones**

USA has prepared an Accident Prevention Plan (APP) for work to be conducted at the Site 12 EOD area under this contract. The APP is provided under separate cover and establishes site-specific safety and health procedures, practices, and equipment to be implemented and used to protect affected personnel

from the potential hazards associated with the field activities to be performed. Also under separate cover is the Site 12 ESS, which establishes exclusion zones (EZs) and other munitions response considerations.

Exclusion zones (EZs) will be established at the MRS while intrusive or disposal operations are being conducted. An EZ is a controlled area where only essential or authorized personnel are allowed while qualifying activities are taking place. Essential personnel are personnel whose duties require them to remain within the EZ to ensure that munitions operations are conducted in a safe and efficient manner. Authorized personnel include agency personnel and others conducting project-related functions that require them to be present in the EZ for a specific purpose for a limited time. Under certain conditions, and on a case-by-case basis, authorized visitors will be granted access to the EZ when operations are being conducted, provided that the following requirements are fulfilled:

- Access is limited to essential personnel and authorized personnel.
- The UXO Safety Officer (UXOSO) has completed an operational risk assessment. In addition, an overall health and safety program shall be implemented that addresses all relevant safety considerations including items not related to UXO in order to comply with NAVFAC Requirements.
- The maximum number of persons allowed in the EZ at one time will be determined by the SUXOS and UXOSO. The ratio of UXO-qualified escorts to visitors will be determined by the UXOSO at the time of the visitation.
- Persons requesting access to the EZ must demonstrate a legitimate need for access and obtain authorization from the Navy, Contractor Project Manager, and UXOSO; they must also submit their access request well enough in advance for the UXOSO to schedule an escort.
- Visitors must receive a site-specific briefing explaining the hazards and safety procedures associated with the EZ and must acknowledge the receipt of the briefing in writing.
- Authorized visitors must be escorted by UXO-qualified personnel at all times.

Any authorized visitor who violates established safety procedures will be immediately escorted out of the EZ for the visitor's own protection and to protect essential personnel in the EZ.

These site-specific procedures addressing EZ access have been developed for this project in accordance with NAVSEA Ordnance Pamphlet (OP) 5, Volume 1, Seventh Revision, with Change 11.

The size of the EZ is based on the hazardous (versus the maximum) fragment distance of the munition with the greatest fragment distance (MGFD) and forms the explosives safety quantity distance (ESQD) arc for the site. Differing ESQD arcs may be required for the same AOC, depending on site conditions and the presence of inhabited buildings, public transportation routes, explosive storage magazines, etc. Formulas that take into account the Net Explosive Weight (NEW) of the MGFD and the site relationships (i.e., distance from exposed site to MGFD) are used to determine the ESQD for the site. Section 10.4 of this MEC QAPP includes a listing of all munitions related items previously found.

The 40-millimeter (mm) Mk 2 projectile is listed as a munition disposed at Site 12 EOD Area and is proposed by the ESS as the munition with the greatest fragmentation distance (MGFD). Based on available historical information about the EOD activities that occurred on site, the 40mm Mk 2 has the greatest MFD-H of the items that could be detonated on the surface which could possibly have resulted in a kick-out. Items on the list which have a greater MFD-H than 1,250 feet would have been buried and subjected to "tamped" detonation. This procedure would not likely result in a kick-out. The normal procedure for operations on an EOD range is to check each detonation site for kick-outs and misfires. No misfires were reported. Table 17-1 identifies the primary and contingency MGFDs from the ESS.

**Table 17-1: Primary and Contingency MGFDs for the Site 12 EOD Area**

MGFD Type	Munitions Item	MFD-H (ft)
Primary	40-mm Mk 2 projectile <sup>(1)</sup>	1,095 <sup>(3)</sup>
Contingency	90 mm M71 projectile <sup>(2)</sup>	1,939 <sup>(3)</sup>

Notes:

1. Selected based fragmentation distance, is the munition having the largest MFD-H of all those potentially to be encountered and still remain within the established fragmentation distance for the range.
2. As explained in Section 3.2 of the ESS, no MEC item larger than a 40-mm Mk 2 projectile is expected to be found. Nevertheless, Table 17-1 includes a contingency round as a precautionary measure.
3. From DDESB Fragmentation Data Review Form, database revision date 16 April 2013 The types of munitions present, or potentially present and included in the ESS are listed in Table 17-1 These are the munitions that were considered in the selection of the primary and contingency MGFD.

Table 17-2 provides the EZs for the primary and contingency MGFDs. MEC and MPPEH that are acceptable to move will be accumulated in a temporary explosives storage magazine for one or more consolidated demolition events. MEC or MPPEH items not safe to move will be left in place until such time as they can be destroyed using the BIP method. Overnight security will be put in place to guard items, if necessary.

**Table 17-2: MGFDs and Exclusion Zones for MRSs**

MGFDs <sup>(1)</sup>		EZs (ft) <sup>1</sup>				
Description	NEW (lb)	Fragmentation Effects		Blast Overpressure Effects		
		HFD	MFD	K328	K40	K24
40-mm Mk 2 projectile (Primary)	0.187	132	1095	188	23	14
90-mm M71 projectile (Contingency)	1.68	288	1939	410	50	30

### 17.2.1 Team Composition and Separation Distance

Field Management Team (FMT): The FMT consists of a SUXOS and a dual-hatted UXO Quality Control Specialist/UXO Safety Officer (UXOQCS/UXOSO). The UXOSO is the responsible position for overall general site health and safety as well as UXO safety.

DGM Team: Parsons will conduct the field DGM. A Parsons will provide a field engineer/technician for operation of the DGM survey equipment. USA will provide a UXO Technician II (UXOTII), familiar with the process, to assist with the data collection and provide anomaly avoidance. A Parsons geophysicist will be on site to process the collected data on a daily basis.

UXO Team: Intrusive investigation of DGM anomalies as well as analog and dig operations will be performed by up to two UXO teams consisting of one UXO Technician III (UXOTIII), a minimum of one UXO Technicians II (UXOTIIs) and two to four UXO Technicians I (UXOTI).

Team separation distance of 23-ft (K40 of the MGFD) will be maintained between intrusive teams and between intrusive operations and DGM operations.

<sup>1</sup> From Fragmentation Data Review Form, data base revision date 16 April 2013



### 17.2.2 Encountering MEC Other Than the Selected MGFD

The intrusive investigation team may excavate anomalies at three individual locations simultaneously. The entire team may work in one area but must maintain the minimum required team separation distance with other teams. If a MEC item is encountered during the course of the investigation that has a greater fragment distance than the selected primary and contingency MGFDs, the SUXOS will immediately cease intrusive operations at the entire project site. The SUXOS will then notify the Contractor Project Manager (PM). The PM will notify the Remedial Project Manager (RPM), and the ESS will be amended to show the new MGFD. The amended ESS will be submitted to NOSSA. Intrusive work at the project site may not continue until an amended ESS is approved. If a MEC item is encountered that has a greater fragmentation distance than the primary MGFD but is covered by the selected contingency MGFD, the SUXOS will immediately notify the Installation POC and USA PM that the EZ distances are being adjusted to the appropriate contingency distance.

### 17.3 Work Elements

Table 17-3 presents the various work elements for this project, the SOPs where the procedures for these work elements are discussed, and locations in other parts of the plans where additional information on these work elements can be found.

**Table 17-3: Project Activities and Supporting Documents**

<b>Definable Feature of Work</b>	<b>USA SOP</b>	<b>Supporting Document(s)</b>
Vegetation Removal	SOP 1 & SOP 2	MEC SAP, APP
Surface Clearance	SOP 3	MEC SAP, APP
Geophysical Survey (DGM)	SOP 4	MEC SAP
Geophysical Data Processing and Interpretation	SOP 5	MEC SAP
DGM Anomaly Investigation	SOP 6, SOP 7, & SOP 12	MEC SAP, ESS, APP
Analog Detection & Removal	SOP 11	MEC SAP, ESS, APP
MPPEH Management	SOP 8	MEC SAP, ESS, APP
Demolition Operations	SOP 9 & SOP 10	MEC SAP, ESS, APP

### 17.4 Mobilization/Site Preparation

#### 17.4.1 Mobilization

Project personnel listed in Section 17.2.1 will mobilize one time to initiate and complete the prescribed field-work for DGM, analog detect and dig and investigation of DGM targets. The FMT provides oversight for all project field activities and will be on site during performance of field work. Mobilization of the crews will be scheduled to maximize project efficiency and use of personnel.

The FMT and one MEC team mobilizes (possibly directly from work at the Quarry) to set up the site and begin vegetation removal. A subcontractor may also be mobilized within the first few days to assist with vegetation clearance.

The DGM will mobilize on approximately day three to set up the IVS, conduct the GSV and begin DGM within the first week of field operations. The final mobilization phase is for a second MEC team to assist after development of the DGM dig list.

The FMT establishes positive communication and checks in with the Brunswick POC. Rentals, such as portable toilets, lockable storage container, munitions storage magazine, and brush mower, will be scheduled for delivery on the first day.

#### 17.4.2 Initial Orientation and Training

Prior to beginning field operations, the FMT will confirm that all personnel have the proper training records and are under medical surveillance, and will provide all employees up to a full day of site-specific training in work plan requirements, equipment operation, and health and safety. This initial training is supplemented throughout the remainder of the project. Training is provided by the SUXOS and the UXOQCS/UXOSO, and records of attendance are recorded. At a minimum, USA personnel receive the training specified in Worksheet #8.

#### 17.4.3 Site Preparation

*Site Survey & Boundary Layout:* The boundaries of DU-2, which is the area not included in the contract, are already staked in the field. However USA personnel will use RTK/DGPS to reestablish and stake the boundaries. The rest of the site is to the existing fence-line. Grid corners for the wooded areas will be set by USA using GPS instruments, such as the Trimble Pro XRT.

*Vegetation Removal:* All grass and brush within the Site 12 boundary (fence-line) will be cut to a height of approximately 6 in. using man-portable brush trimmers, chain saws, and a mechanized brush mower. Trees within the areas indicated for DGM on Figure 2 will be cut down, chipped and the chips broadcast. Larger trees that are in the open may be left in place. The clumps of fast growing pines are the main target for removal. Vegetation clearance in the heavily wooded areas, such as the north and east areas around the pond, will be limited to cutting of grass, brush, and tree limbs that would directly impede the movement of the detection equipment. Larger cut vegetation will be chipped and broadcast.

*Temporary Munitions Magazine:* A temporary Type II explosives magazine is to be set up and grounded prior to surface clearance work. An area that is clear of metallic anomalies is to be selected. Appendix A, Figure 2 indicates the proposed location for the magazine. The purpose of the magazine is for temporary storage of MEC and MPPEH found on site and determined to be safe to move. The magazine will not be utilized for storage of donor explosives. The site perimeter fencing is to be inspected to verify that it is secure. Additional fencing around the magazine is not required, as long as the site can be secured with the existing fence and gates.

*Surface Clearance:* Surface clearance has already been conducted for most, if not all, of the area to be DGM'ed. However, surface clearance may be necessary for the vehicle path on the east side of the pond prior to DGM and following vegetation removal. The ground surface will be cleared of visible metallic debris in order to limit the interference with detection equipment. Non-munitions related metallic debris will be inspected to ensure that it poses no explosive hazard and then disposed of through a local recycler. Locations of any MPPEH found on the surface will be recorded, and the items will be addressed in accordance with the applicable SOPs.

#### 17.4.4 Geophysical System Verification Plan

##### 17.4.4.1 Geophysical System Verification Plan

A GSV process will be implemented at Site 12 to demonstrate that the instrument and data collection strategies selected for the site function as intended for the duration of the field investigation. Within this process, an IVS will be used to verify the proper functioning of the EM61-MK2 units used during the project. The IVS is an area containing buried “industry standard objects,” or ISOs, that are used to verify that the geophysical instruments are functioning correctly. Furthermore, a blind seeding program will be used to provide dynamic monitoring of geophysical data collection, data processing, and target selection procedures. USA’s UXOQCS will seed the production area with Blind Seed Items (BSIs), using small and medium ISOs.

The IVS will consist of three parallel lines, each seeded with two small ISOs (4-in.-long sections of 1-in. pipe) buried at three and seven times their diameter according to Table 17-4. The three lines will parallel and be separated by 1 meter to allow the three coils of the EM61-MK2 towed array to pass directly over the ISOs. When testing an individual EM61-MK2 over the IVS, only the center line will be used. Each ISO will be oriented horizontally and in-line with the direction of data collection along the IVS. The along-line location of the ISO may be modified due to obstructions, terrain, or other site conditions found during construction of the IVS. Following burial, the center point of each seed item will be surveyed using real-time kinematic (RTK) GPS capable of centimeter accuracy.

A “noise strip” located adjacent to the IVS will be used to determine the background noise level of the EM61-MK2s. The noise strip will contain no discreet anomalies or buried ISOs and will consist of three straight, well-defined lanes equal in length to the adjacent IVS strip. The noise level will be defined as the standard deviation of the sensor readings recorded along the noise strip.

After the IVS and noise lines are established they will be surveyed at least five times to determine the baseline response for each ISO. The responses from those first five IVS datasets will be averaged to determine the expected response. Data will be collected over the IVS and noise strip twice daily with each geophysical instrument. During these tests the instrument operator will make a single pass over both the IVS and the adjacent noise strip. The travel path over each strip will be well marked to ensure that the instrument passes directly over the center of each ISO and that background data are collected in a consistent manner from day to day.

**Table 17-4: IVS Seeding Table**

Item ID	Line	Down Line Distance (m)	Burial Depth <sup>(1)</sup> (m)	Modeled Sum Channel Response (mV) <sup>(2)</sup>
ISO-1	1	2	0.10 (3 x OD)	37.6
ISO-2		17	0.23 (7 x OD)	15.5
ISO-3	2	7	0.10 (3 x OD)	37.6
ISO-4		22	0.23 (7 x OD)	15.5
ISO-5	3	12	0.10 (3 x OD)	37.6
ISO-6		27	0.23 (7 x OD)	15.5

(1) Depth measured from ground surface to the center of the ISO.

(2) Nelson, H. H., *EM61-MK2 Response of Three Munitions Surrogates*, 2009.

The sum channel responses recorded over each ISO will be compared to the initial responses to verify that the instrument is functioning correctly. The noise level measured from the noise strip will also be recorded each day and compared with previous values to confirm that the noise level is consistent and low enough to not cause excessive false positive anomalies.

#### *17.4.4.2 Analog Test Strip*

The center line of the IVS will be used to test the hand-held analog instruments.

#### *17.4.4.3 Blind Seed Items*

In order to provide dynamic monitoring of the quality of the geophysical data collection and target selection process throughout the project, “blind seed items” will be located at the frequency specified in Worksheet #12.

#### *17.4.4.4 Instrument Verification Strip Letter Report*

Following initial IVS testing using the instruments and techniques proposed for the project, the collected data will be submitted for review. If there are no changes to the Measurement Performance Criteria (MPCs) based on the IVS results, then DGM data collection will begin immediately after the initial IVS surveys. If the initial IVS surveys indicate changes to the MPCs are necessary, a field change request will be submitted to propose alternative MPCs. Results of the IVS data evaluation will be summarized in a letter report, which will be provided electronically within one week of completion of the initial data acquisition over the IVS.

### **17.5 Digital Geophysical Mapping (DGM)**

#### **17.5.1 DGM Methods**

DGM surveys will be conducted throughout as much of the area as possible with the goal of 100% coverage. The majority of geophysical data will be collected using towed-arrays consisting of three Geonics EM61-MK2 sensors pulled by an all-terrain vehicle (ATV) (e.g., John Deere Gator, 4-wheel drive truck, or tractor). Single sensor, hand-towed EM61-MK2 data will be collected in areas inaccessible to the towed-arrays. In areas where the sky is open to GPS satellites, geophysical data will be collected in conjunction with RTK GPS to record the surveyed paths. Where tree cover obscures the sky and interferes with RTK GPS performance, analog detection methods will be used. The geophysical investigation approaches are described in SOP 4, Digital Geophysical Mapping.

To assure the quality of the mapped geophysical data, several tests will be performed with the geophysical instruments. These tests are described in Section 17.4.4 and the MPCs for the tests are listed on Worksheet #12.

### **17.6 Geophysical data Processing and Interpretation**

The purpose of the DGM task is to provide a total anomaly count and an anomaly map of the site to aid in the selection of anomalies which will be targeted for intrusive investigation.

Following data collection, geophysical data will be transferred from the field data logger/laptop computer to the data processing computer for data processing as outlined in SOP 5, Data Processing and Interpretation.

#### **17.6.1 Anomaly Selection**

Due to the presence of small munitions (i.e., 20mm projectiles) previously found within Site 12, the anomaly selection threshold will be set just above the background noise level to maximize detection capabilities without greatly increasing the false positive rate. This is standard for many munitions

response sites where anomaly selection is based on the desire to detect the smallest munitions item of concern, which is the 20mm projectile. More importantly it enables detection of all objects as deep as possible. Typically, targets are selected with a minimum Signal to Noise Ratio (SNR) of 3 to 5 – realizing that the lower the number, the greater the chance of false positives (i.e., there is no actual target present where indicated by the DGM. Rather it is a background noise signal.). For this project the anomaly selection threshold will be set at an SNR of 5. When the correct SNR is applied, anomaly selection will include some false positive results, which verifies that the anomaly selection threshold is not set too high to where the smaller items would be missed.

Part of the GSV process requires determination of what the site or background EM noise level will be across the site. This is done at the IVS. The background noise level will be the calculated standard deviation of the data collected over the IVS noise line. That noise level will be multiplied by 5 to establish the anomaly selection threshold.

If background noise levels measured at the IVS noise strip or in background portions of the survey area are higher than the initial measurements the anomaly selection threshold may be raised to prevent an excessive number of false positive anomalies. If this becomes necessary, a Field Change Request will be issued for review and approval, prior to implementation

## **17.7 Intrusive Operations**

Subsurface investigation consists of reacquiring selected DGM anomalies and then excavating the anomaly using hand tools.

### **17.7.1 DGM Anomaly (Target) Reacquisition**

USA conducts testing of all detection instruments prior to the start of the MEC and MPPEH clearance and at the beginning and end of each intrusive work day. The MEC Team Leader documents instrument performance verification and these documents are provided to the FMT for inclusion in their daily and weekly reports. The USA reacquisition team uses the RTK DGPS (or tape measures for L/S/F positioned data) to reacquire the selected DGM targets. A pin flag marked with the target identification number is placed at the target location. The intrusive team uses the EM61-MK2 to refine the target location prior to excavation. The peak mV response is to be recorded. Refer to Appendix B, SOP 12.

### **17.7.2 Excavation of DGM Target Anomalies**

Once enough targets have been flagged, the dig team will begin the intrusive investigation. USA implements MEC intrusive investigations in accordance with DoD and DON requirements, SOP 6 and 7 and the ESS. Soil is excavated adjacent to the anomaly location to minimize direct contact with the excavation tools. Then the anomaly can be safely exposed for inspection. Once the source of the metallic signature is identified, the MEC Clearance Team uses the following procedure for handling uncovered items.

Discovered MEC or MPPEH items are visually inspected to determine if the item poses an explosive hazard. If the initial inspection of the item is determined to pose an explosive hazard, the UXO Technician marks the location of the item with a pin flag for subsequent inspection by the SUXOS and UXOSO/UXOQCS. If it is determined by the SUXOS and UXOSO/UXOQCS that the item is acceptable to move, it is then relocated to the temporary munitions magazine, which is located on site for MEC storage only, for later on-site explosive disposal or venting.

Throughout the fieldwork, the MEC Team Leader closely monitors the work of the UXO Technicians, and records the results of each anomaly investigated on the dig list or PDA. The MEC Team Leader or assigned technician performs a post-intrusive EM61-MK2 check to ensure the anomaly signature is below the anomaly selection threshold to assist in preparation for the QC inspection. If necessary, intrusive

operations are continued until the anomaly source is completely resolved. Separate records for each individual dig are prepared and maintained. At completion of the intrusive activities, the team backfills all excavation holes to match the contours of the surrounding area and maintain natural drainage paths.

#### 17.7.3 Excavation of DGM Polygons

Areas of dense metallic anomalies result in an area that can be bounded by a polygon on the DGM map. In these locations the EM response for individual items cannot be discerned. Excavation either by hand or utilizing mechanical equipment, such as a backhoe or mini excavator is necessary to investigate and characterize the source material. For a small area (i.e. less than 6-ft across) complete investigation is recommended. For a larger area, it may be preferable to dig a test pit within the polygon. All polygons will be reviewed with the PDT prior to inclusion for investigation during this RI.

Mechanical excavation equipment, such as a combination backhoe or mini-excavator may be utilized to dig the overburden material. Standard anomaly avoidance and trench safety techniques will be utilized for safe excavation of the material in 1-ft lifts. A general description of the excavated material will be recorded for each 1-ft lift. Discovery of any objects or conditions that would trigger the requirement to collect samples for a Hazardous Toxic or Radioactive Waste (HTRW) site will be reported. Excavations will be limited to a maximum depth of 5-ft. Outside of the EOD berm area (DU-2), it is expected that if material has been buried, it will be within 5-ft of the ground surface.

#### 17.7.4 Encountering Significant Non-Munitions Items of Concern

The following steps are provided as guidance for potential discoveries encountered when investigating munitions disposal areas. On a case-by-case basis, actual procedures will be based on judgment from the field, consultation with the Navy and regulatory agencies, and consultation with a disposal facility.

Intact or partially intact drums:

- Follow Health and Safety procedures identified in the Health & Safety Plan for this project to ensure appropriate worker safety protection
- Identify if the drum has a label and general condition.
- Characterize (sample) the drum contents to determine proper Transportation and disposal requirements.
- In the event that a non-intact container is encountered, the soil around it will be sampled by collecting a six-point wheel composite sample for the full suite of analytes (i.e., VOCs, SVOCs, metals, explosives, pesticides, PCBs).
- Document the observed contents (or description of contents in the drum) and photograph
- If the drum is deemed movable by the SUXOS, place drum into a “salvage drum/overpack” and move to a drum containment area, which will be constructed using soil berms and lined with poly sheeting to temporarily stage the drums prior to disposal
- Prepare manifest for Navy signature, and ship for disposal.

Potential ACM:

- Collect a sample to determine if ACM (friable or non-friable)
- Receive results, consult with the PDT, and arrange for disposal accordingly

Stained soil:

- Collect soil sample for full suite of analytes included for soil in the MC RI (2011 SAP).
- Consult with Navy and Regulatory agencies. Depending on size, color, odor, Photo Ionization Detector (PID) reading, and analytical results, may decide that this area needs further investigation

## **17.8 MEC/MPPEH Management and Disposal**

### **17.8.1 MEC Management**

USA will manage all MEC, MPPEH, and related debris in accordance with DoD and DON requirements and the approved project ESS. USA accounts for all MEC/ MPPEH items or components encountered from field discovery to point of disposal. MEC and MPPEH accounting includes the amounts of MEC/MPPEH, identification and condition, location, orientation, depth, storage, and disposition. This information is also provided to the Navy RPM.

Items determined and documented in writing to be acceptable to move by the SUXOS and the UXOSO are relocated to a temporary explosives storage magazine. Only MEC and MPPEH will be stored in the magazine. Donor explosives will not be stored in the magazine. A consolidation point is selected within the MRS for treatment by explosive venting or detonation using appropriate and approved engineering controls. The demolition consolidation location shown on Appendix A, Figure 2 is proposed, and the location will be adjusted in the field as necessary. USA contacts the Navy POC when any discovered MEC or MPPEH is determined unacceptable to move. Unacceptable to move items are marked and treated using the BIP method, with the appropriate and approved engineering controls. No discovered MEC or MPPEH will be left unsecured or unattended. Items left in place for BIP that cannot be treated by the end of the working day it is discovered will be barricaded or marked for avoidance. The site is fenced in. Therefore, overnight security is not necessary unless the Navy POC requests overnight security, in which case overnight security will be provided. The UXOTIII records identification data of all MEC or MPPEH items/components, including quantities, nomenclature, condition, location, and depth of MEC or MPPEH, and collects digital photographs of MEC or MPPEH found during the investigation. The accounting system accounts for all demolition materials utilized to detonate MEC and/or MPPEH on site. The MEC accounting is included in an appendix to the RI/FS Report. USA keeps digital photographs of identifiable MEC found during the investigation. Photos are referenced to the MEC locations displayed in the GIS.

### **17.8.2 MEC Disposal**

USA will treat by explosive venting/detonation all MEC in accordance with DoD and DON requirements as described in the approved ESS and the MEC QAPP SOPs. Once the MEC has been treated or removed, the hole is checked to ensure that the initial item was not masking additional anomalies. Once the determination has been made that the hole is clear, it is backfilled; the location is then leveled with the surrounding ground and restored to its prior condition.

All MEC items encountered during this RI are treated by countercharging the munitions with an explosive donor charge and detonating the donor charge. During clearance activities, explosive treatment operations are performed under the direct supervision of the SUXOS. Prior to initiation of any explosive charge, the SUXOS ensures that all required coordination is made with all necessary agencies (e.g., Navy Caretakers Office), and that the EZ is clear of non-essential personnel.

USA is prepared for treating any MEC items found. Explosive treatment operations are supported with on-call explosives provided by Independent Explosives. Navy regulations require disposal operations to be conducted using a minimum four-person team comprised of the following individuals: a SUXOS, a

second UXOTIII, and a minimum of two UXOTII/Is. All personnel directly or indirectly engaged in MEC operations are thoroughly trained and capable of recognizing hazardous explosive exposures. All personnel are required to read, become familiar with, and adhere to all general safety regulations, and safe work practices are observed at all times.

All explosive treatment operations are performed using DDESB-approved engineering controls. During disposal of MEC items, safety is the primary concern. The most obvious requirements are to protect personnel, the public, and the environment from fire, blast, noise, and fragmentation. Planned detonation of explosives requires more stringent safety distance requirements than those for ordnance in storage, and is conducted IAW the requirements outlined in NAVSEA OP 5, DDESB Technical Paper 16 (TP-16) and DOD 6055.09M.

All USA personnel engaged in MEC demolition activities utilize these procedures. However, situations may warrant additional safety measures, such as fire trucks, medical personnel, and protective clothing. As a courtesy, the installation POC will notify the local police of planned demolition. The SUXOS has the overall responsibility to comply with the minimum requirements described in the preceding subsections and has the authority to upgrade those requirements as the situation dictates.

### 17.8.3 MPPEH Management

USA will manage and dispose of all MPPEH in accordance with the approved ESS and NAVSEA OP 5. All anomaly items located within the MRSs are initially classified as MPPEH. Inspection and classification of MPPEH is a critical aspect of MEC operations and only personnel qualified as UXOTII or above are allowed to inspect and classify MPPEH. MPPEH items are re-inspected and further classified and certified by a UXOTIII or higher as MEC or MDAS. If it cannot be classified as either of these, it remains as MPPEH.

Munitions-related MDAS requiring demilitarization is placed in sealed, lockable containers with all the required documentation completed. At the completion of the clearance effort, the MDAS in sealed containers is shipped to a demilitarization/recycling facility, such as Timberline Environmental Services (TES) for demilitarization and final disposition. Non-munitions related MDAS requiring no demilitarization is staged on site. At the end of the project the required documentation is completed, and the material and documentation is turned over to a scrap dealer.

Prior to shipment or release of all MDAS, the SUXOS completes a Disposal Turn-in Document DD Form 1348-1A (series), or a local form as authorized by the commanding officer, which includes the following statement:

*"The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard"*

The SUXOS signs the Disposal Turn-in Document to certify inspection of the material and the UXOQCS signs as the verifier. After certification and verification of the MDAS, the material will either be demilitarized by shredding and/or smelting in order to render the items unusable and/or unrecognizable as a military item in accordance with DoD 4160.21-M-1, or turned over to a recycling facility. USA retains legible copies of all documents supporting the explosives safety status of the material as MDAS (such as the signed DD Form 1348-1A and any other documents associated with the inspection and/or re-inspection of the material) for a minimum of three years. USA tracks all documentation from cradle to grave and includes all documentation in the RI Report. Details of the MDAS inspection process are provided at SOP 7.



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**18.0 QAPP Worksheet #18: Sampling Locations and Methods/SOP Requirements Table**

<b>Sampling Location (Grid) / ID Number</b>	<b>Exclusion Areas</b>	<b>Matrix</b>	<b>Depth relative to Ground Surface (units)</b>	<b>Analytical Group (NA for MEC EHP Site) Alternative Field Name – Survey Methodology</b>	<b>Degree of Investigation or Coverage</b>	<b>Sampling SOP Reference</b>
DGM accessible areas. DUs will be developed from the processed DGM for areas within the Site 12 LUC fence. Existing grids will be used in conjunction with the DUs.	EOD Berm Area (DU-2), Site 12 Pond and debris piles associated with the pond. Exposed Rock. Heavily wooded areas and areas too steep to conduct DGM. The LUC fence-line itself.	Subsurface soils	To detection limits	DGM	100% of DGM accessible area	SOP 4
Areas not accessible to DGM, primarily the heavily wooded area east of the pond. This area may be subdivided into smaller grids in order to select a portion of the grids for investigation.	Rock face or slopes too steep to walk on. Any grids which the PDT determines not to include in the clearance.	Subsurface soils	To detection limits	Analog Detector Detect and Dig  Exclusion area boundaries are to be mapped with hand-held GPS.	100% coverage of the sample location area.	SOP 11

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## 19.0 QAPP Worksheet #19: Analytical SOP Requirements Table

Note: This worksheet pertains to chemical analysis and related activities and not to MEC Site Inspection.

Matrix	No. of Samples	Analytical Group	Analytical and Preparation Method/SOP Reference <sup>1</sup>	Sample Volume	Containers (number, size, and type) <sup>a</sup>	Preservation Requirements	Maximum Holding Time (preparation/analysis)

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**20.0 QAPP Worksheet #20: Field Quality Control Sample Summary Table – Refer to WS#12 for MEC investigation QC**

Matrix	Characterization or Removal Procedure	Number of units applicable to QC Survey	No. of Field Duplicates	Number of BSIs per Grid or DU	No. of Field Blanks	No. of Equip. Blanks	Total Number or area of QC Sampling

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## 21.0 QAPP Worksheet #21: Project Sampling SOP References Table

All of the SOPs have some level of modification for project specific conformance. However, no significant changes to USA's standard procedures were necessary. SOPs related to environmental sampling are available in the Site 12 MC SAP (Tetra Tech, 2012).

Reference Number	Title, Revision Date and/or Number	Originating Organization of SOP	Equipment Type or Instrument	Modified for Project Work?	Comments
SOP 1	MEC Avoidance	USA	Analog Detectors	Yes	
SOP 2	Vegetation Removal	USA	Vegetation cutting equipment	Yes	
SOP 3	Surface Clearance	USA	Analog Detectors and GPS equipment	Yes	
SOP 4	Digital Geophysical Mapping	USA	RTK DGPS Positioning & Electromagnetic sensor	Yes	
SOP 5	Geophysical Data Processing and Interpretation	USA	Computer/Software	Yes	
SOP 6	Intrusive Operations	USA	Analog Detectors	Yes	
SOP 7	Excavator Operations	USA	Backhoe or Tracked Excavator	Yes	
SOP 8	MPPEH Management	USA	Shipping containers	Yes	
SOP 9	MEC Management & Disposal	USA	Explosives and Demolition Equipment	Yes	
SOP 10	Explosives Acquisition, Accountability and Transportation	USA	Explosives	Yes	
SOP 11	MEC Analog Detection & Removal	USA	Analog Detectors	Yes	
SOP 12	DGM Target Reacquisition	USA	RTK DGPS Positioning	Yes	



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## 22.0 QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Activity	Frequency	Acceptance Criteria	Corrective Action	Resp. Person	SOP Reference	Comments
Hand-held metal detector	Battery Strength Test	3 times/day	Audio response over metallic object	Replace batteries; re-work if necessary	Operator	SOP 11	
	Functional Check	At start of operations	Audio response over IVS standardization item	Assess/correct instrument set-up (cables, settings); perform instrument maintenance; replace unit; re-work if necessary	Operator		
EM61-MK2	Battery Strength Test	At beginning and end of each survey area; after equipment restart	Battery strength no less than 12V at start and no less than 10.8V at finish	Replace batteries; re-work survey area	Operator	SOP 4	
	IVS Data Collection	See Worksheet #12	See Worksheet #12	Repair or replace unit; examine data taken since last test-rework if necessary	Operator		
PID	Refer to the Site 12 MC SAP (Tetra Tech, 2012) Worksheet #22 for information on the PID.						

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### 23.0 QAPP Worksheet #23: Analytical SOP References Table

Note: This worksheet pertains to chemical analysis and related activities and not to MEC Site Inspection. Analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)

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## 24.0 QAPP Worksheet #24: Analytical Instrument Calibration Table

Note: This worksheet pertains to chemical analysis and related activities and not to MEC Site Inspection. Analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference <sup>1</sup>

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## 25.0 QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection

Note: This worksheet pertains to chemical analysis and related activities and not to MEC Site Inspection. Analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference <sup>1</sup>



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## **26.0 QAPP Worksheet #26: Material Potentially Presenting an Explosive Hazard (MPPEH) Management**

MPPEH is managed in accordance with DoD Instruction 4140.62, Subject: Material Potentially Presenting an Explosive Hazard, Naval Sea Systems Command (NAVSEA) OP 5 Volume 1 and as outlined in SOP 8.

USA's MPPEH management procedures will ensure that unknown explosive hazards are not present when MDAS is shipped to the qualified recycler/smelter and the chain of custody is maintained until the MDAS is signed for by the qualified recycler/smelter for final processing. The MPPEH procedural requirements include:

- A 100-percent inspection and an independent 100-percent re-inspection of all MPPEH by two UXO Technicians II or above.
- Procedures to ensure that MPPEH is not commingled with MDAS.
- Ensure that MDAS is not misidentified as MPPEH once it has been determined to be safe.

Personnel that are responsible for controlling the transfer of MDAS to the qualified recycler/smelter are designated in writing by the Project Manager to the Commanding Officer of the cognizant Facilities Engineering Command for endorsement to the appropriate Defense Reutilization and Marketing Office or qualified recycling program.

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## 27.0 QAPP Worksheet #27: Sample Custody Requirements

Note: This worksheet pertains to chemical analysis and related activities and not to MEC Site Inspection. Analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).

Sample Identification Procedures: NA
Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): NA
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): NA

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## 28.0 QAPP Worksheet #28: QC Samples Table

Note: This worksheet pertains to chemical analysis and related activities and not to MEC Site Inspection. Analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).

Matrix

Analytical Group

Analytical Method / SOP Reference

QC Sample	Frequency / Number	Method / SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank						
Laboratory Control Spike (LCS)						
Laboratory Field Blank (LFB)						

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## 29.0 QAPP Worksheet #29: Project Documents and Records Table

Project Reports and Records	Generator	Definable Feature of Work	Frequency of Completion	Location/Where Maintained
Monthly Progress Report	PM	All	Once per month	MRA Contract/Corp Office Files
Daily Site Report	SUXOS	All	Daily	WP, App C/ Project Field Files
Weekly QC Report	UXOQCS	All	Once per week	WP, App C/ Project Field Files
QC Surveillance Checklists	UXOQCS	All	As required	All SOPs
QC Surveillance Tracking Form	UXOQCS	All	As required	WP, App C/Project Field Files
Personnel Qualification Verification Form	UXOQCS	All	As required	WP, App C/Project Field Files
Deficiency Notice	UXOQCS	All	As required	WP, App C/Project Field Files
Deficiency Notice Log	UXOQCS	All	As required	WP, App C/Project Field Files
Nonconformance Report	UXOQCS	All	As required	WP, App C/Project Field & Corp Office Files
Nonconformance Report Log	UXOQCS	All	As required	WP, App C/Project Field Files
Corrective Action Request	UXOQCS	All	As required	WP, App C/Project Field & Corp Office Files
Corrective Action Request Log	UXOQCS	All	As required	WP, App C/Project Field Files
Field Change Request	UXOQCS	All	As required	WP, App C/Project Field & Corp Office Files
Field Change Request Log	UXOQCS	All	As required	WP, App C/Project Field Files
Operator/Instrument Test Form	UXOQCS	Surface Clearance & Intrusive Operations	Daily	WP, App C/Project Field Files
DGM Checklists	Site Geophysicist	Geophysical Survey	As required	SOP 4, Att. 2/Project Field Files



<b>Project Reports and Records</b>	<b>Generator</b>	<b>Definable Feature of Work</b>	<b>Frequency of Completion</b>	<b>Location/Where Maintained</b>
Checklist for Data Processing	Site Geophysicist	DGM Data Processing	Daily	SOP 4, Att. 1/Project Field Files
Weekly DGM QC Report	UXOQCS	DGM Data Processing	Weekly	SOP 4, Att. 2/Project Field Files
Checklist for Data Storage and Transfer	Site Geophysicist	DGM Data Processing	Daily	SOP 4, Att. 3/Project Field Files
Explosive Disposal Log	Demo Supervisor	MPPEH Management & Disposal	Each demolition event	SOP 9, Att. 5/Project Field Files
Clearance Data and Munitions Accountability Log	UXO Team Leaders	Surface Clearance & Intrusive Operations	Daily	SOP 4, Att. 3; SOP 5, Att. 1/Project Field Files
MEC/MPPEH Log	SUXOS	Surface Clearance & Intrusive Operations	Daily	WP App F/Project Field Files
Hazardous & Regulated Waste Disposal Chain of Custody and Facility Manifest	SUXOS	Contingency for Handling Potential Regulated Waste	Each Occurrence	Project Field and Corp Office Files
General Safety Briefing	UXOSO	All	Daily	WP App E, Att. 7/Project Field Files
Tailgate Safety Briefing	UXOSO	All	Daily	WP App E, Att. 7/Project Field Files
Safety Inspection Report	UXOSO	All	As required	WP App F/Project Field Files
Site Visitor Log	SM/UXOSO	All	As required	WP App F/Project Field Files
Accident/Near Miss Report	UXOSO	All	As required	WP App F/Project Field Files
Contractor Serious Incident Report (CSIR)	UXOSO	All	As required	WP App F
Record of Safety Violation/Non Compliance Report	UXOSO	All	As required	WP App F/Project Field Files

<b>Project Reports and Records</b>	<b>Generator</b>	<b>Definable Feature of Work</b>	<b>Frequency of Completion</b>	<b>Location/Where Maintained</b>
SUXOS Logbook	SUXOS	All	Daily	Project Field Files
UXOSO Logbook	UXOSO	All	Daily	Project Field Files
UXOQCS Logbook	UXOQCS	All	Daily	Project Field Files

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### 30.0 QAPP Worksheet #30: Analytical Services Table

Analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).

Matrix	Analytical Group	Sample Locations/ID Number	Analytical Method	Data Package Turnaround Time	Laboratory Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
NA	NA	NA	NA	NA	NA	NA

Not Applicable

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### 31.0 QAPP Worksheet #31: Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person Responsible for Performing Assessment	Person Responsible for Responding to Assessment Findings	Person Responsible for Identifying and Implementing Corrective Actions (CA)	Person Responsible for Monitoring Effectiveness of CA
Audit of Project Activities	Once during project	Internal	USA	Program Quality Section	Program Quality Control Manager (DSQ)	Site PM, UXOQCS	DSQ
Personnel Qualifications	Once, plus as new personnel join team	Internal	USA	DSQ	PM, Staffing Manager	PM, Staffing Manager	DSQ
Accident/Incident Reporting	Per event	Internal	USA	UXOSO	UXOSO, Program Occupational Safety Manager (POSM), Corporate QM	POSM, Corporate QM	UXOSO, Corporate QM
Turn-in of recovered MDAS	Daily	Internal	USA	UXOTIII	SUXOS	UXOQCS	DSQ
Preventive Maintenance	Daily	Internal	USA	SUXOS	PM	SUXOS	PM
Communications Equipment Inspection	Daily	Internal	USA	UXOTIII	UXOSO	UXOSO	UXOQCS
Safety Inspections	Daily	Internal	USA	UXOSO	SUXOS	SUXOS	UXOSO
Explosives Transportation	As needed to support operations	Internal	USA	UXOSO	Independent Explosives, Inc.	Independent Explosives, Inc.	UXOSO
Vegetation Clearance	Daily	Internal	USA	SUXOS	UXOTIII	UXOTIII	SUXOS
Analog Detector Operations	Daily	Internal	USA	UXOQC	UXOTIII	UXOTIII	UXOQCS

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person Responsible for Performing Assessment	Person Responsible for Responding to Assessment Findings	Person Responsible for Identifying and Implementing Corrective Actions (CA)	Person Responsible for Monitoring Effectiveness of CA
Excavation Operations	Daily	Internal	USA	UXOSO	UXOTIII	UXOTIII	SUXOS
MEC/MPPEH Final Disposal	Weekly	Internal	USA	UXOSO	SUXOS, Demo Supervisor	SUXOS, Demo Supervisor	UXOSO
MEC/MPPEH Accountability	Weekly	Internal	USA	UXOSO	SUXOS	SUXOS	UXOSO
DGM Operations	Weekly	Internal	USA	Project Geophysicist	Project Geophysicist	Project Geophysicist	UXOQCS
Safety and Health Program	Weekly	Internal	USA	POSM	UXOSO	UXOSO	POSM
Visitor Briefing	As needed	Internal	USA	UXOSO	SUXOS	UXOSO	SUXOS
Site-Specific Training	As needed	Internal	USA	Corporate QM	DSQ	DSQ	Corporate QM
Hazard Assessment	As needed	Internal	USA	POSM	UXOSO	UXOSO	POSM
NAVFAC or NOSSA Audit of MRS	TBD	External	TBD	TBD	PM	Site PM, UXOQCS	DSQ

## **32.0 QAPP Worksheet #32: Change Control Management**

USA's Quality Improvement Process comprises the internal systems that evaluate the quality program's effectiveness in ensuring and continually improving the quality of work. The primary goal of the Quality Improvement Process and the QC program as defined in this document is to prevent deficiencies or non-conformances and facilitate continual process improvement. To the extent that the first of these goals is not achieved, identified deficiencies or non-conformances will be corrected in a timely and cost-effective manner and with the intent of preventing their recurrence. This QAPP includes provisions for preventing quality problems and facilitating process improvements as well as identifying, documenting, and tracking deficiencies until corrective actions have been verified.

During the course of the project, it is possible that changes to the WP, QAPPs, or other implementing documents are required or desired to ensure that the project objectives are met, respond to changes in site conditions, and/or implement methods of improving overall project safety, quality, or productivity, as appropriate (without compromising other project objectives).

Project staff at all levels will be encouraged to provide recommendations for improvements in established work processes and techniques. The intent will be to identify activities that are compliant with the existing plans/procedures, but can be performed in a more efficient or cost-effective manner. Typical quality improvement recommendations include identifying a bottleneck in production and/or recommending an alternative practice that provides a benefit without compromising prescribed standards of quality or safety.

It is important that these changes be applied only after they have been evaluated to ensure that the change will not compromise the project's objectives, quality and/or safety. Therefore, procedures have been developed to ensure that changes are reviewed by USA and the Navy before implementation. Changes may only be implemented once the appropriate reviews and approvals have been made.

The distribution of the approved WP will be controlled by the DSQ to ensure that the most recent and accepted version is available at all locations where activities essential to the effective functioning of the QC program described herein are performed. Revision numbers and effective dates will be indicated in the document control header. Revisions to this plan will require the same level of approval, control, and distribution as the original; however, it will avoid the necessity of issuing new plans. Revisions will be handled via the Field Change Request (FCR) and Design Change Notice (DCN) process. A DCN will be used to document changes to the scope of work, plans, specifications/drawings, or to reflect significant changes in the QC or health and safety programs. Under this process, replacement pages may be issued for insertion into the approved project plans. All changes must be accompanied by the FCR form with appropriate approval signatures.

### **32.1 Field Change Request/Design Change Notice**

Changes to designs, plans or procedures will be documented using the FCR form. This form will document the Navy's concurrence with changes. The USEPA and MEDEP will be given an opportunity to review field changes. An FCR is used to request and document changes identified as a result of unanticipated field conditions or identification of field activities that are procedural and will not affect the original schedule, design specification, quality, safety, or scope of work. The FCR forms are signed by the NTR to acknowledge the changed condition. Only when the FCR has received approval from all reviewers will the change be implemented. FCRs will be discussed in the weekly QC meeting and included in an After Action Report.



### **32.1.1 FCR/DCN Initiation**

The UXOQCS and/or the SUXOS may initiate an FCR/DCN individually or collectively by completing Sections 1 to 3 of the FCR or DCN form, as appropriate. The FCR/DCN is then submitted to the Project Manager who coordinates review of the FCR with the DSQ, and POSM, if health and safety related.

The FCR/DCN must be brought to the immediate attention of the Project Manager. If implementation of the DCN would result in a change in the cost, scope of work, design, or result in significant project delays or work stoppage, the PM will immediately notify the Government, as appropriate.

### **32.1.2 FCR/DCN Review**

The Project Manager receives the FCR or DCN and coordinates the review process. Each FCR/DCN will be sequentially numbered, as follows:

- FCR or DCN-ECDA-YYY, where YYY is the FCR or DCN number, beginning with 001

The appropriate managers and the DSQ must be included in the review process. The Project Manager must also review the FCR/DCN if production related and the POSM must be included in the review process if the FCR/DCN involves health and safety issues. All involved managers must complete, sign, and date Section 4 of the FCR/DCN to indicate their approval. The DSQ will review the FCR/DCN after all other reviews have been completed and promptly forward the FCR/DCN to the Navy RPM and NTR for approval. In the case of a DCN, the request for approval is sent to the Contracting Officer. All FCRs/DCNs will be discussed as part of the weekly QC meeting.

### **32.1.3 FCR Implementation**

Each approved (or rejected) FCR/DCN will be copied to all management signatories, the SUXOS, UXOQCS, UXOSO, and other personnel as deemed appropriate by the Project Manager. A copy of each approved (or rejected) FCR/DCN will also be retained in the contract file and included as part of the Final Report.

FCRs/DCNs will be tracked on the FCR/DCN Tracking Form. This form will be continually updated through the FCR/DCN Approval Phase, and will also track FCRs/DCNs that are rejected.

The SUXOS shall implement the approved FCR/DCN in the field. All FCR, DCN, deficiency notices, non-conformance reports and the status/logs will be discussed during the Weekly QC Meeting and included in the After Action Report.

## **32.2 Deficiency Management**

All deficiencies or nonconforming conditions discovered during inspections or other QC functions will be noted on a Deficiency Notice (DN) or a non-conformance report (NCR), as appropriate. Deficiency Notices are used to document the failure to develop, document, or implement effectively any applicable element of approved plans or to follow established procedures. A deficiency could lead to a non-conformance. An NCR documents a deficiency that renders the quality of an item, process, or product that has been defined in the specifications or drawings as unacceptable or indeterminate. The DN or NCR will identify, at minimum, any corrective action identified, the individuals reviewing and approving of the actions, and the actions taken to prevent recurrence. DN and NCR logs will be maintained to document and track corrective actions to closure.

The DSQ will be responsible for tracking deficiencies to closure and reporting their status on daily reports and log forms. The DSQ will discuss deficiencies with the project team during the weekly QC meeting and memorialize all issues in the After Action Report. If a deficiency has the potential to result in a need for re-work or jeopardizes the quality of future work to the extent that re-work may be required, the DSQ

will be expected to stop work or recommend and implement immediate corrective action to address the deficiency.

### **32.2.1 Corrective Action**

Once a process displays a characteristic out of specification with those required for the project or quality objectives, corrective action must be conducted to identify the cause of the deficiency or non-conformance. When the cause of the problem is identified, appropriate corrective action can be instituted and then monitored for effectiveness.

### **32.2.2 Root Cause Analysis**

Determining the root cause of a non-conformance is an integral part of the QC process. The depth and extent of the root cause analysis depends on the situation; the root cause may be as simple (minor) as an overlooked step or procedure or it may be complicated. Root cause analysis is the responsibility of the functional manager or a designee. Input can be obtained as necessary from field personnel and technical advisors in order to identify the factors that led to the problem. The root cause is almost always “upstream” from where the problem is detected. A two-step strategy will be employed for determining the root cause of a deficiency or nonconformance for this project. First, the problem will be traced back to the source. Second, the cause will be evaluated using basic questions such as who, what, when, where, why, and how. This process will be repeated until the cause is identified.

### **32.2.3 Implementation of Corrective Action**

Following the root cause analysis, the project personnel will undertake the most effective remedy to correct the problem. Potential remedies to be considered may include the following:

- Supplemental personnel training
- Changes of equipment or modification of equipment currently in use
- Acquisition of supplemental equipment
- Implementation of new procedures or modification of existing procedures
- Changes in QC procedures

Successful implementation of corrective action will be documented on the deficiency notice or NCR. Through follow-up phase surveillance, the UXOQCS will verify that the corrective action implemented has rectified the non-conforming condition and is sufficient to prevent recurrence. The results of the corrective action will be presented in the interim After Action or Final Report, as appropriate.

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### 33.0 QAPP Worksheet #33: QC Management Reports Table

Type of Report	Frequency (Daily, Weekly, Monthly, Quarterly, Annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
Weekly QC Report	Weekly	By noon the following Monday	UXOQCS	USA DSQ, QA Contractor
QC Meeting Minutes	Weekly	Close of business (COB) on second day after QC Meeting	UXOQCS	USA DSQ, QA Contractor
Project QC Report	Draft and Final	Appendix to RI/FS Report	PM and DSQ	Navy RPM,
QC Project Checklist	Once at beginning of project	At first QC meeting	UXOQCS	USA DSQ, QA Contractor
Preparatory Phase Inspection Form	One for each DFW before start of work	By noon of following day	UXOQCS	USA DSQ, QA Contractor
Initial Phase Inspection Form	One for each DFW before start of work	By noon of following day	UXOQCS	USA DSQ, QA Contractor
Follow-up Phase Inspection Form	One for each DFW each week activities are conducted	By noon of following day	UXOQCS	USA DSQ, QA Contractor

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### 34.0 QAPP Worksheet #34: Verification (Tier 1) Process Table – Preparatory and Initial Inspections

A preparatory phase inspection will be performed prior to beginning each DFW. The purpose of this inspection is to review applicable specifications and verify the necessary resources, conditions and controls are in place and compliant before the start of work activities. An initial phase inspection will be performed at the beginning of each DFW. The purpose of this inspection is to observe/review the application of procedures to ensure their adequacy, ensure adequate resources are applied to the activity and that a clear understanding exists as to the quality control requirements of the DFW. The responsible person will inspect the relevant items from the checklist in the SOP.

<b>Definable Feature of Work</b>	<b>Supporting QC Document(s)</b>	<b>Responsible for Verification (Name, Organization)</b>
Mobilization/Site Preparation	Pre-Construction Meeting, Verification of Personnel Qualifications/Training Checklists, Plans Acknowledgement Signature Sheets, MEC QAPP WS 17, SOP-3 Surface Clearance Preparatory/Initial Checklist, SOP-2 Vegetation Removal Preparatory/Initial Checklist	USA Project QC Manager and UXOQCS
Surface Clearance	SOP-3 Surface Clearance Preparatory/Initial Checklist	USA UXOQCS
DGM	SOP-4 Geophysical Survey and SOP-5 Geophysical Data Processing Preparatory/Initial Checklist	USA UXOQCS and Project Geophysicist
Intrusive Operations	SOP-6 Intrusive Operations Preparatory/Initial Checklist and SOP 11 MEC Analog Detect & Removal	USA UXOQCS
MEC/MPPEH Management and Disposal	SOP-9 Explosives Demolition Preparatory/Initial Checklist, SOP-8 MPPEH Management Preparatory/Initial Checklist, and SOP-10 Explosives Acquisition, Accountability and Transportation Preparatory/Initial Checklist	USA UXOQCS

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### 35.0 QAPP Worksheet #35: Tier 2 QC Process

Follow-up inspections are conducted to ensure that procedures are being correctly preformed, no changed conditions exist which may impact the quality of work and lessons learned are being captured and applied. The UXOQCS will inspect the applicable follow-up items from the checklist in the listed SOP, as often as specified in the chart below. Worksheet #12 describes actions to be taken in the event that nonconforming conditions are observed during the QC inspections

Definable Feature of Work	Frequency of Inspection	Supporting QC Document(s)	Responsible for Verification (Name, Organization)
Mobilization/Site Preparation	N/A	No follow-up required for this DFW	
Surface Clearance	Minimum of one per day of surface clearance operations	SOP-3 Surface Clearance Preparatory/Initial Checklist	USA UXOQCS
Intrusive Operations	Minimum of one per day of intrusive team operations	SOP-6 Intrusive Operations Preparatory/Initial Checklist	USA UXOQCS
MEC/MPPEH Management and Disposal	Weekly and per demolition event	SOP-9 Explosives Demolition Preparatory/Initial Checklist, SOP-8 MPPEH Management Preparatory/Initial Checklist, and SOP-10 Explosives Acquisition, Accountability and Transportation Preparatory/Initial Checklist	USA UXOQCS and SUXOS
Geophysical Survey	Minimum of one per day of field data collection operations	SOP-4 Geophysical Survey Preparatory/Initial Checklist	USA Project Geophysicist and UXOQCS
Geophysical Data Processing/ Interpretation	Per data set	SOP-5 Geophysical Data Processing Preparatory/Initial Checklist	USA DSQ and Project Geophysicist



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### **36.0 QAPP Worksheet #36: Product QC Tier 3 Process Summary**

The actions taken to investigate the MRS will be documented and submitted for MRS Certification. A certification package is prepared by the contractor for review by the Navy. This package will document the steps taken to ensure the quality of the information relied upon to develop the RI Report.

USA's certification process encompasses five steps taken to ensure data quality. Step I documents and reviews the preparatory QC activities for each DFW (see WS #34). Step II summarizes and reviews the initial and follow-up phases of QC inspections and certification (see WS #35). Step III reviews documentation of the specific quality requirements for geophysical processing and interpretation. Step IV is a review of MEC investigation operations including review of follow-up phase QC checklists and compliance with the MEC QAPP surveillance requirements. Step V documents USA's actions to ensure that all selected DGM targets and analog and dig areas have been cleared using BSI and a resurveying 15% of each DGM target or analog and dig grid (randomly selected area).

All five steps are fully documented and packaged for review by the USA MRS Certification Team. The team is comprised of the UXOQCS, the Project geophysicist, and the SUXOS. The team will certify each step of the quality process has been completed and forward the package for approval by USA's PM and DSQ, prior to submission to the Navy for approval. Upon Navy approval, the package is forwarded to stakeholders as noted above.

The process steps are more fully discussed in the following sections.

#### **36.1 QC Tier I: Pre-Operational Preparation**

Step I of the MRS Certification process includes verification of training, personnel qualifications, construction of the IVS and IVS certification testing of all geophysical and UXO teams and equipment, grid layout and vegetation removal. Surveillance checks ensured the completion and documentation of mandatory pre-operational preparation. For each production team, a Preparatory Phase Checklist will be used to document training, personnel qualifications, and equipment status. A Three-Phase Inspection Checklist has been developed for each DFW, to be completed prior to beginning work associated with the DFW. Appropriate SOP checklists will be completed on each project field team prior to the actual performance of the investigation activities. The Three-Phase QC Checklist incorporates the Preparatory, Initial, and Follow-Up QC inspection phases into one combined checklist. The Preparatory Phase portion of the checklist will be used during the pre-operational training step of project operations. This QC checklist will document that all the pre-operational actions delineated in the SOPs have been met and that each field team is prepared to conduct field MEC clearance operations. A punch list of individual team deficiencies discovered during the Preparatory Phase will be provided to the Project Geophysicist, and the SUXOS for corrective action. A record of the completed checklists will be maintained in the field QC file, reported in the Daily QC Report, and discussed in the Weekly QC Meeting.

Geophysical and UXO field teams will be tested through the IVS prior to commencing actual field operations. An IVS Certification Form, documenting Geophysical and UXO team members by name, search equipment serial numbers, and IVS score, will be maintained for each field team in the QC file. Each field team must obtain a minimum score of 0.95 probability of detection.

#### **36.2 QC Step II: Initial and Follow-Up Phase Of QC Inspection and Surveillance**

Step II of the MRS Certification/QC process documents that the definable features of work were completed in accordance with the contract specification, WP and approved QAPPs and SOPs. The Initial and Follow-Up Phase checklists have been incorporated into the Three-Phase QC Inspection Checklist process within each SOP. The Initial and Follow-Up Phase checklists will be used to document that all aspects of the remedial action are completed in accordance with the applicable procedures. The combined

checklists are designed to verify that the SOPs-for, geophysical surveying, DGM target investigation, and MEC clearance procedures are being followed during the performance of RI field operations. Information to be included in the SOP-specific three-phase checklists consists of:

- Teams performing geophysical and intrusive UXO work at project field sites were successfully IVS certified for the entire time that they performed the field work.
- Grid corners (where applicable) are certified as being placed in the correct location(s).
- QC surveillance forms for Geophysical and UXO field teams have documented that each team has followed the appropriate SOP for the fieldwork being conducted.
- The MRS has been geophysically surveyed by an EM61 MK2 in accordance with this plan and verified by database-generated grid maps.
- All BSIs were identified in the analog geophysical surveys and recovered.
- Inspections of DGM anomaly lists to verify that all BSI target anomalies have been detected and accurately reported.
- All MEC items found have been properly disposed.
- All grids have been completed prior to submission of documentation to the MRS Certification Team, which will certify completion of the RI objectives.
- All site restoration efforts performed in accordance with this plan.

A record of the completed checklists will be maintained in the site QC file, and reported in the Daily QC Report.

### **36.3 QC Step III: QC of Digital Geophysical Mapping**

Step III confirms the independent verification of the DGM task. Initially, the Project Geophysicist will ensure independent verification of DGM processing and interpretation of the geophysical data collected by the project geophysical teams.

The independent verification team will generate an anomaly list and the Project Geophysicist will compare it with the anomaly list of the production team. If discrepancies between the two target sets exist, the Project Geophysicist, and the Site Geophysicist will compare processing techniques. QC discrepancy is defined as:

- 20 percent differential in picks between the two teams; or
- Failure to identify a BSI as a pick.

It is anticipated that this combined effort will start during IVS testing and will continue throughout the duration of the project. This initial duplicative process will ensure that geophysical interpretation criteria, as it relates to data quality objectives, will be consistent and, potentially, improve whenever differences arise in an effort to exceed performance standards.

### **36.4 QC Step IV: Intrusive Investigation Operations**

Step IV operations will be a continuation of Step II. An SOP specific Follow-Up checklist, along with appropriate QC surveillance forms, will document that the UXO Teams are properly conducting anomaly investigations in accordance with the approved procedures.

WS #35 of the MEC and MC QAPPs provides the frequency of inspection for the DFW.

A copy of each QC surveillance report will be filed in the site QC file, and reported on the Daily QC Report.

### 37.0 QAPP Worksheet #37: Usability Assessment

The following is an example form to be completed during the certification process for Site 12 MRS anomalies.

QC Step	Items to be checked/verified	DGM	Analog and Dig Grids
QC Step I	Verified Qualifications/Training Checklist has been completed for all personnel.		
	Have the WP, MEC QAPP, and APP been reviewed by MEC teams during the preparatory phase?		
	Discrepancies found in the Preparatory Phase checklist have been corrected prior to Initial Phase Inspections for UXO teams.		
	Verified Preparatory Phase 1 Checklist has been completed for all DFWs/SOPs.		
	Have the WP, MEC QAPP, and APP been reviewed by UXO teams during the preparatory phase?		
	Discrepancies found in the Preparatory Phase 1 checklist have been corrected prior to initial Phase Inspections for UXO teams.		
	Verified IVS constructed as prescribed in WS #17		
	Verified UXO Team(s) met IVS Certification.		
	Verified boundary and grid layout conform to tolerances in WS #17		
	Signatures on appropriate documents (SOPs, forms, etc.)?		
	Verification that the initial and follow-up three-phase quality control checklists have been completed for UXO team(s).		

QC Step	Items to be checked/verified	DGM	Analog and Dig Grids
QC Step II	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the MEC team(s).		
	Have all personnel assigned to the UXO team been IVS Certified?		
	Have all equipment assigned to the UXO team been IVS Certified?		
	Verification that the initial and follow-up three-phase quality control checklists have been completed for UXO team(s).		
	Discrepancies found in the initial and follow-up three-phase quality control checklists have been corrected and documented for the UXO team(s).		
	Have all personnel assigned to the UXO team been IVS certified?		
	Have all equipment assigned to the UXO team been IVS Certified?		
	Signatures on appropriate documents?		
	Verify 100% Production BSIs recovered		
	Verified that the Project Geophysicist re-processed random 5 percent of grid geophysical pick lists.		
QC Step III	Verified that the Project Geophysicist compared QC and anomaly targets.		
	Discrepancies have been investigated and the results have been documented.		
	Appropriate actions have been taken by the DSQ regarding the results of the QC Phase III investigation.		
	Signatures on appropriate documents?		
	Verification of follow-up checklist or quality control surveillances have been completed for all UXO teams.		

QC Step	Items to be checked/verified	DGM	Analog and Dig Grids
QC Step IV	Discrepancies found in the follow-up three-phase quality control checklist or quality control surveillances have been corrected and documented.		
	Verify that surveillances in the MEC QAPP were completed?		
	Signatures on appropriate documents?		
	If non-confirming units were found, corrective actions followed the MEC QAPP.		
QC Step V	Discrepancies corrected and surveillances written.		
	QC Step V Random Sampling inspection samples were identified and investigated.		
	Discrepancies have been investigated and the results have been documented for the Step V surveillance.		
	Signatures on appropriate documents?		
	<b>NAMES</b>	<b>SIGNATURES</b>	<b>DATES</b>
SIGNATURES			

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## **REFERENCES**

### **RELATED WORK PLANS**

USA Environmental, 2013. Final Accident Prevention Plan (APP) for Site 12 EOD Area, Naval Air Station Brunswick, Brunswick, Maine. Revision 1, September 2013.

Department of the Navy, 2013. Final Explosives Safety Submission (ESS) for Munitions and Explosives of Concern Investigation/Removal Action at Site 12 EOD Area, Naval Air Station Brunswick, Brunswick, Maine, April 2010, Amendment 1, April 2013.

Tetra Tech, 2012, Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Munitions Constituents Remedial Investigation of Site 12 EOD Area, Former Naval Air Station Brunswick, October 2012.

### **PRIOR INVESTIGATIONS**

Tetra Tech, 2009a. Site Inspection Report for Munitions and Explosives of Concern Areas, Site 12 EOD Area, Former Munitions Bunker West Area, Quarry. Naval Air Station Brunswick, Brunswick, Maine. Contract Task Order. 0069. June.

Tetra Tech, 2009b. Munitions and Explosives of Concern Removal Action for the Site 12 Explosive Ordnance Disposal Area and the Former Munitions Bunker West Area. Naval Air Station Brunswick, Brunswick, Maine. Contract Task Order. WE09. June.

Tetra Tech, 2012. Munitions and Explosives of Concern Time-Critical Removal Action Work Plan for Quarry Area and Site 12 Explosive Ordnance Disposal Area, Former Naval Air Station Brunswick, Brunswick, Maine, Contract Task Order 0069, March.

Remedial Investigation Report for Site 12 Explosive Ordnance Disposal Area, Former NAS Brunswick, Brunswick, Maine, Tetra Tech, June 2013.

### **FEDERAL REGULATIONS**

United States Environmental Protection Agency (USEPA), 2002. Guidance for Quality Assurance Project Plans, EPA QA/G-5, Final. December.

USEPA, 2005. Uniform Federal Policy for Quality Assurance Plans (UFP-QAPP) Part 1: UFP-QAPP Manual, Final, Version 1. March.

ATF Publication 5400.7 Bureau of Alcohol, Tobacco, Firearms and Explosives, Federal Explosives Laws and Regulations.

### **OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION**

OSHA Regulations, 29 CFR 1910, Hazardous Waste Operations and Emergency Response, March 1989.

### **DEPARTMENT OF DEFENSE PUBLICATIONS**

DOD 6055.09-M, Ammunition and Explosive Safety Standards

DDESB TP-18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, December 2004

### **DEPARTMENT OF NAVY PUBLICATIONS**

Department of the Navy, 2007. Project Procedures Manual, U.S. Navy Environmental Restoration Program, NAVFAC Pacific.



OPNAVINST 8020.15A, Explosives Safety Review, Oversight, and Verification of Munitions Responses (27 Feb 2008)

Operations Pamphlet (OP) 5, Vol.1, 7<sup>th</sup> Revision, Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping

NOSSA Instruction (NOSSAINST) 8020.15D, Explosives Safety Review, Oversight, and Verification of Munitions Response (26 Jan 2009)

#### **UNITED STATES ARMY CORPS OF ENGINEERS PUBLICATIONS**

U.S. Army Corps of Engineers Safety and Health Requirements Manual. Engineer Manual 385-1-1 (15 September 2008)

U.S. Army Corps of Engineers (USACE), Washington, DC. Engineer Manual 1110-1-1002, Survey Markers and Monumentation, 1 March 2012

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## **APPENDIX A. FIGURES**

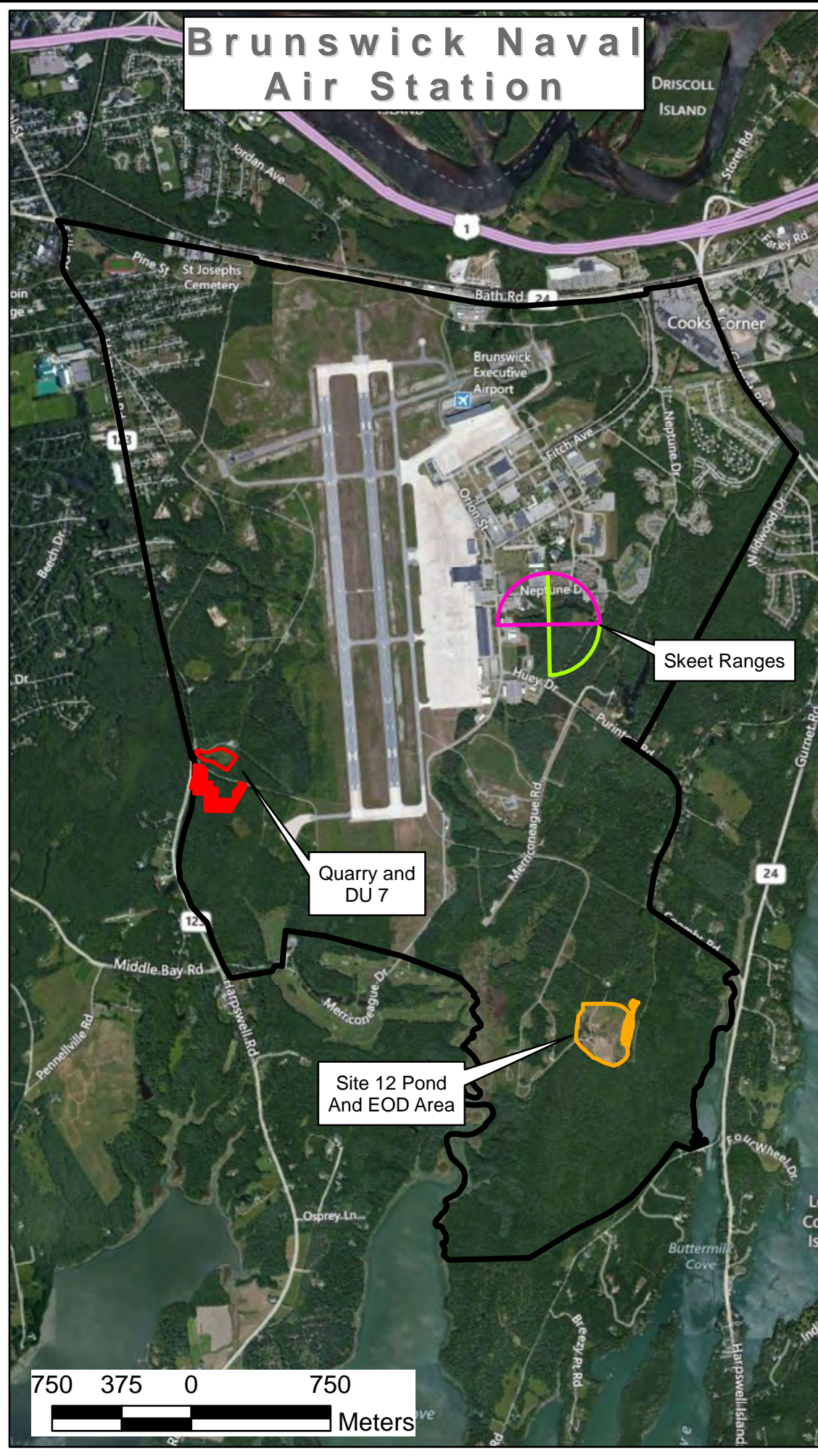
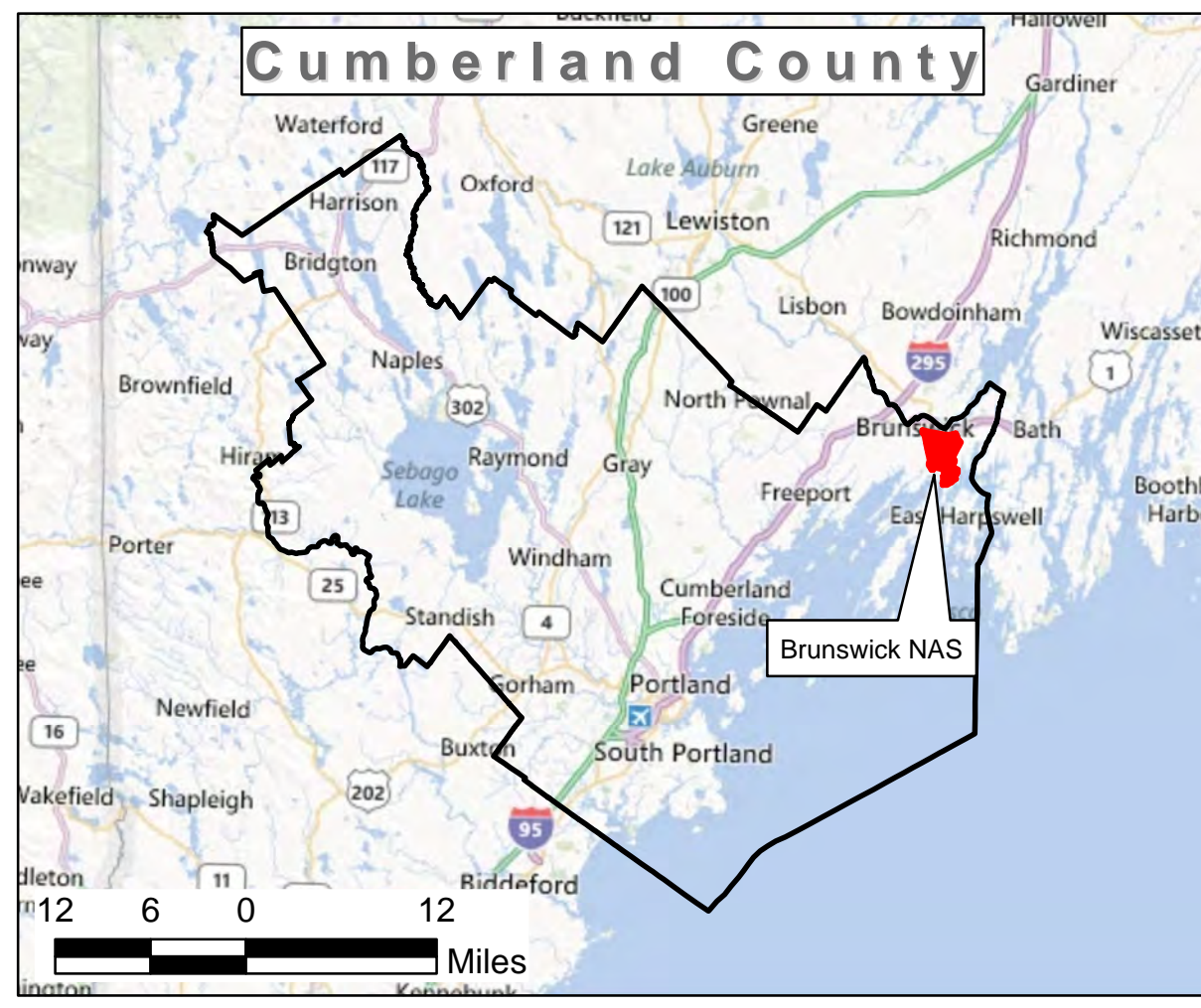
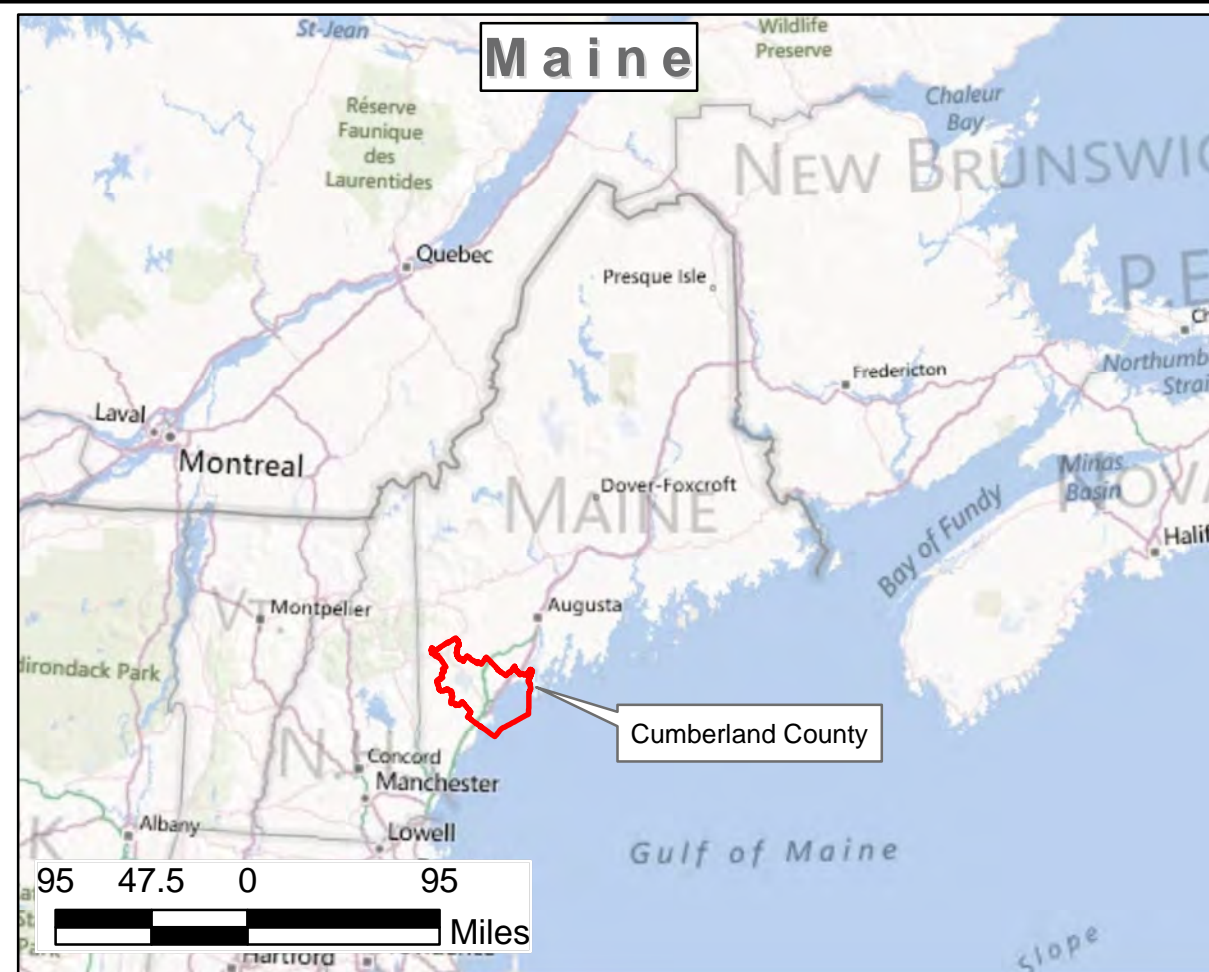
This appendix contains the following figures for the Site 12 MEC RI:


- Figure 1 – NAS Brunswick Site Location Map
- Figure 2 – Site 12 EOD Area and Pond Site Map

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Scale Varies

*Data is projected to the UTM Coordinate System:  
Zone 19 North, NAD83, Units in Meters.*





**NAS Brunswick, Maine**

**Figure 1**

**NAS Brunswick Site Location Map**

**Legend**

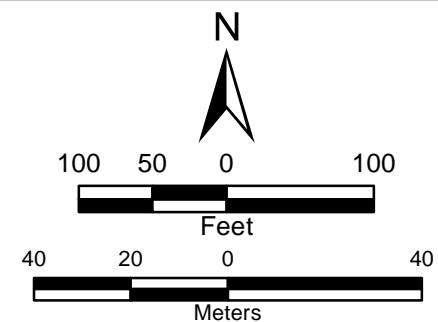
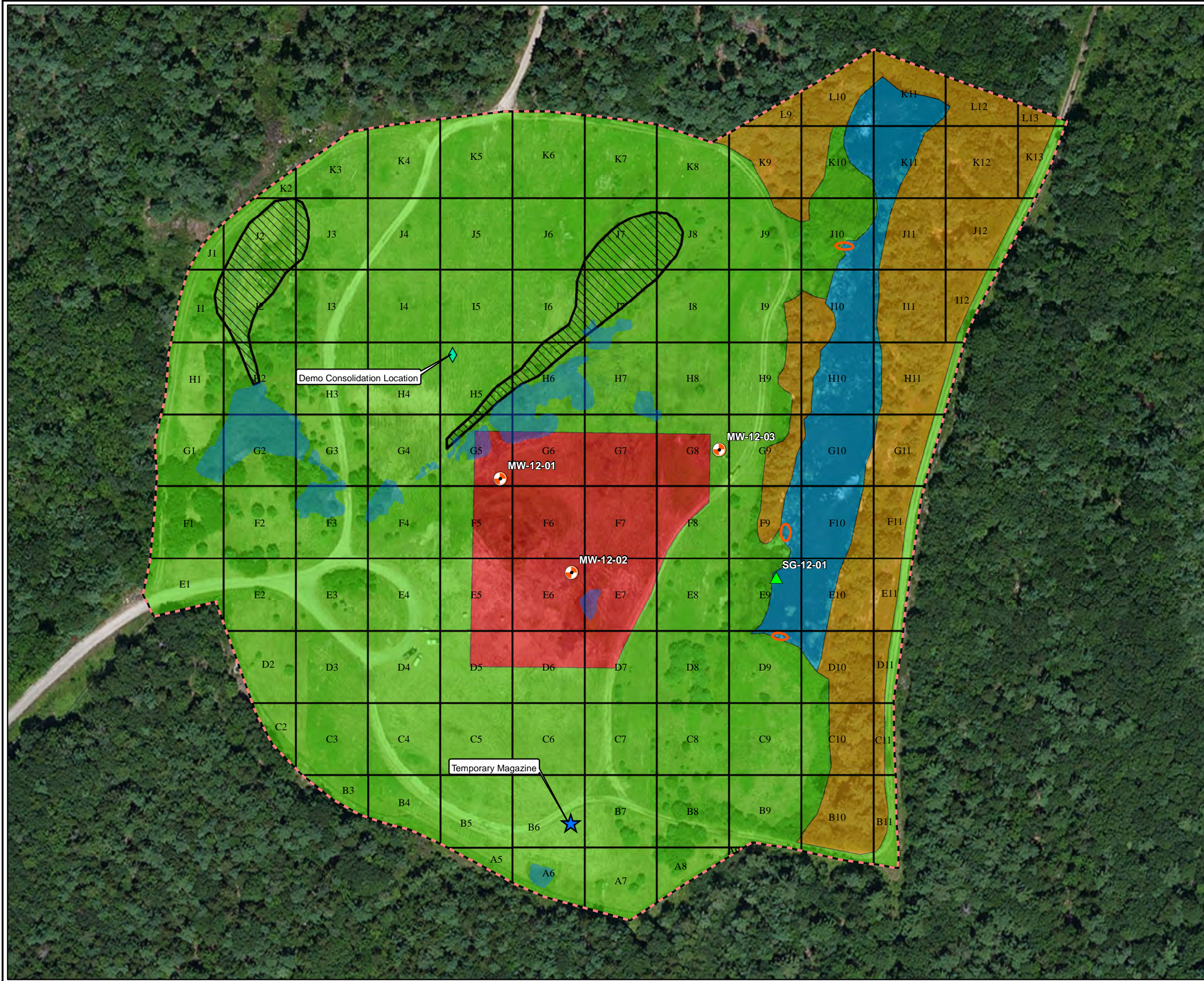
- Skeet Range - post-1950
- Skeet Range - pre-1950
- Quarry
- Quarry/ DU 7
- Site 12 EOD Area
- Site 12 Pond
- Brunswick NAS Boundary

 		
Drawn By: JAL	Scale: Varies	Rev:
Checked By:	Date Drawn: 10-26-2012	
Submitted By: RH	Revision Date:	
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Data is projected to the UTM Coordinate System:  
NAD 1983 UTM Zone 19N

Brunswick Site 12 Area

## Figure 2

### Site 12 EOD Area And Pond Site Map

NAS Brunswick, Maine

#### Legend

- ★ Temporary Magazine
- ◆ Demo Consolidation Location
- ◻ Debris Pile
- ⊙ Monitoring Well
- ▲ Staff Gauge
- - - Land Use Control Boudary (Chain Linked Fence)
- Previously Identified Wetlands
- ▨ Estimated Steep Slope
- 100'x100' Grids
- Berm Area (DU-2)-Not In Contract (2.04 ac.)
- Pond Area (DU-5) (1.46 ac.)
- Wooded Area (3.44 ac.)
- Estimated DGM Accessible Area (17.25 ac.)

USA  
Environmental, Inc.



Drawn By:	JAL/CLH	Scale: 1 inch = 40 meters	Rev: 1
Checked By:		Date Drawn:	8/16/2013
Submitted By:		Revision Date:	9/10/2013



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Map.mxd







## **APPENDIX B. STANDARD OPERATING PROCEDURES**

This appendix contains the following SOPs for the Site 12 MEC RI:

1. MEC Avoidance
2. Vegetation Removal
3. Surface Clearance
4. Digital Geophysical Mapping
5. Geophysical Data Processing and Interpretation
6. Intrusive Operations
7. Excavator Operations
8. MPPEH Management
9. MEC Management and Disposal
10. Explosives Acquisition, Accountability and Transportation
11. MEC Analog Detection and Removal
12. DGM Target Reacquisition

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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**MEC AVOIDANCE**

**SOP 1**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Project Work Plan (WP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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### 3. ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
BSI	Blind Seed Item
DGM	Digital Geophysical Mapping
EM	Engineer Manual
ESS	Explosives Safety Submission
GSV	Geophysical System Verification
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	personal protective equipment
SHSP	Site Health & Safety Plan
SOP	Standard Operating Procedure
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WP	Work Plan

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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) Unexploded Ordnance (UXO)-qualified personnel to conduct munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH), avoidance procedures during the activities at the Former Naval Air Station (NAS) Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the project area and will be used to direct avoidance operations.

Developed by:



James Walden  
Project Quality Control Manager

9/23/2013

Date

Reviewed by:



Robert Hierholzer  
Project Manager

9/23/2013

Date

Charles Bobo  
UXO Safety Officer

Date

Approved by:



Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and  
Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:14:32 -04'00'

Robert Crownover  
Director of Safety and Quality

Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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## 5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Brian Thompson  
Senior UXO Supervisor

Date

## 6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

[illegible]

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## **7. PROCEDURES**

### **7.1 PURPOSE**

The purpose of this SOP is to provide USA employees and subcontractors with the minimum procedures, and safety and health requirements, applicable to conducting and observing MEC avoidance procedures during operations within the project area.

### **7.2 SCOPE**

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in conducting and adhering to MEC avoidance procedures during the activities within the project area. This SOP is not a stand-alone document and should be used together with Work Plans (WP), other USA SOPs, the Accident Prevention Plan (APP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

### **7.3 MEC/MPPEH BASIC SAFETY PRECAUTIONS**

The following basic safety precautions will be observed while conducting MEC avoidance procedures.

- Do not touch or disturb MEC items; mark their location with a red pin flag and avoid them.
- Avoid the forward portions of munitions employing proximity fuzing.
- Do not expose electrically fired munitions to radio, cell phone or satellite phone transmissions within 25 ft.
- Do not collect souvenirs.
- Do not smoke except in designated areas.
- Do not carry fire- or spark-producing devices into the exclusion zone (EZ).
- Prohibit non-essential personnel from encroaching upon the site.
- Suspend all operations immediately upon approach of an electrical storm.

### **7.4 MEC AVOIDANCE**

MEC avoidance operations may be required in support of the installation of the instrument verification strip (IVS), blind seed item (BSI) installation, surveying and marking investigation area boundaries, and other non-MEC field activities requiring intrusive activities, or access by non-UXO qualified personnel (e.g., soil sampling, visitor access to the EZ).

If MEC items are encountered during the activities listed above, the UXO Technician will place a red pin flag near the item, record identification and location information in the Personal Digital Assistant (PDA), take a photograph, advise all personnel of the item's location and avoid the item while conducting the activity. Under no circumstances will MEC be handled.

#### **7.4.1 Avoidance Procedures for IVS Installation**

The IVS general location is selected in accordance with the approved Geophysical Systems Verification (GSV) Plan. The IVS location is further refined by UXO Technicians conducting an instrument aided surface sweep in order to find areas "clear" of metallic debris that would adversely affect the ability of the digital geophysical mapping (DGM) equipment (EM61 MK2) to measure the responses of the IVS test items.

#### **7.4.2 Avoidance Procedures for Blind Seed Installation**

Blind seeds [small Industry Standard Objects (ISOs)] will be installed semi-randomly at a frequency of approximately two per acre. An area 3 ft around each seed emplacement will be scanned with a handheld metal detector prior to emplacement, to ensure the area is free from other surface or subsurface anomalies. Holes will be excavated with a shovel. The blind seeds will be emplaced and documented, in accordance with the GSV Plan.

#### **7.4.3 Avoidance Procedures for Location Surveys and Soil Sampling**

MEC encountered will be marked, avoided, and recorded as stated above. Prior to driving stakes for grid corners, installing monuments or soil sampling, the UXO Technician will search the location with a handheld metal detector. Any subsurface anomaly will be assumed to be MEC and an alternate anomaly-free location will be chosen.

### **7.5 WORK CLOTHING AND FIELD SANITATION**

Work clothing will be appropriate for the conditions encountered. In most cases, this will be Level D personal protective equipment (PPE), which includes the following:

- Short- or long-sleeved cotton coveralls or work clothing will be worn.
- Footwear will be sturdy work boots or rubber boots as appropriate (i.e., lug sole, and of sufficient height for ankle support). UXO personnel will not wear steel-toe safety boots when using metal detectors.
- Safety glasses will be worn.
- Inclement weather gear will be worn, as required.

The team will be outfitted with field decontamination equipment which will consist of containers of water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.

### **7.6 QUALITY CONTROL**

The only specific quality control metrics for the MEC avoidance task are to perform a check on the all-metals detector to ensure it is functioning properly, and conduct a communications check. The team will ensure all other equipment needed for the supported task is functional prior to entering project work areas.

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**8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF**

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the MEC avoidance task along with methods to mitigate the hazards.

**Table 1: Hazard Analysis Matrix**

<b>Activity</b>	<b>Hazard</b>	<b>Triggering Events</b>	<b>Initial Risk Index</b>	<b>Hazard Mitigation</b>	<b>Final Risk Index</b>
MEC Avoidance	Slips, Trips or Falls	Climbing; debris, holes or crevasses obstructed from view by vegetation.	C/III/4	Assess surroundings prior to proceeding with field activities. Ensure footing at all times.  Wear leather safety toe work boot with ankle support and non-slip soles.	D/IV/5
	Hot Weather	Seasonal weather patterns.	C/III/4	Monitor for heat stress; provide cool drinking water, work-rest schedule, and cool shelter for breaks.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear.  Keep feet dry (carry extra socks).  Monitor team members for signs of cold stress disorder, in accordance with the APP.	D/IV/5
	Biological	Biting/stinging insects.	C/III/4	Wear long sleeve garments and apply repellent to exposed skin as needed.  Use barrier cream as necessary.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams (see the hazard control briefing that follows).  All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort.  UXO-qualified person will locate an anomalous-free area with the metal detector prior to digging or placing a pin flag into the ground.	D/III/5



Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Sunburn	Work in outdoor environment	B/IV/4	Use sunscreen.	C/IV/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

### 8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader on the existing and potential hazards within the project area prior to commencing any activities. The Activity Hazard Analyses (AHA) for the activities the team will perform will be reviewed and signed by all team personnel; these AHAs are presented in Appendix B of the APP.

Personnel will be cognizant of their surroundings at all times and remain observant of their footing as they traverse the project area. All personnel will be aware of the signs of heat stress or cold stress as described in Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Personnel will wear long sleeve clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects.

In areas outside of the DGM areas, the potential for encountering MPPEH is low. If access into the DGM areas is necessary, the UXO-qualified escort will conduct a detector-aided survey of the access route and will ensure no anomalies are present in any area that will be excavated or disturbed while conducting field activities. All personnel will adhere to the direction of the UXO-qualified escort at all times and will not veer outside of areas surveyed by the escort. The team separation distance (TSD) will be maintained as follows:

- 23-ft based on the K40 distance for the 40-mm Mk2 projectile, (primary)
- 50-ft based on the K40 distance for the 90-mm M71 projectile, (contingency)

If a munitions item with larger fragmentation distance is encountered, the work will stop for a modification to the Explosives Safety Submission (ESS).

### 9. DIAGRAMS

The site map and DGM area maps are located in Appendix A of the WP. Teams will be provided maps of the overall project site and evacuation routes.

### 10. EQUIPMENT

The UXO technician providing MEC avoidance escort services will be equipped with the following:

- Handheld all-metals detector
- Red pin flags for marking suspected MEC items
- Logbook and/or PDA for recording data

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- Camera
- Communications equipment

Safety equipment required includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the Site Health and Safety Plan (SHSP), Section 10.2, will be followed. A copy of the SHSP is maintained in all project site vehicles.

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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**VEGETATION REMOVAL**

**SOP 2**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 2

DESCRIPTION: VEGETATION REMOVAL

REVISION No.: FINAL

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DESCRIPTION: VEGETATION REMOVAL

REVISION No.: FINAL

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## **2. REFERENCES**

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Project Work Plan (WP)
- Accident Prevention Plan (APP)
- Site Health and Safety Plan (SHSP)
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual
- Equipment Operator's Manual(s)

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PROCEDURE No.: SOP 2

DESCRIPTION: VEGETATION REMOVAL

REVISION No.: FINAL

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### **3. ACRONYMS AND ABBREVIATIONS**

APP	Accident Prevention Plan
BSI	blind seed item
EM	Engineer Manual
ESS	Explosives Safety Submission
ft	foot, feet
in	inch, inches
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosives Hazard
NOSSA	Naval Ordnance Safety and Security Activity
OJT	On the Job Training
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	personal protective equipment
QA	Quality Assurance
QC	quality control
SOP	Standard Operating Procedure
SHSP	Site Health & Safety Plan
SUXOS	Senior UXO Supervisor
TSD	Team Separation Distance
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXOTII	UXO Technician II
UXOTIII	UXO Technician III
WP	Work Plan



PROCEDURE No.: SOP 2

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DESCRIPTION: VEGETATION REMOVAL  
REVISION No.: FINAL  
DATE: SEPTEMBER 2013  
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ATTACHMENT: QUALITY CONTROL SURVEILLANCE CHECK SHEET

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PROCEDURE No.: SOP 2

DESCRIPTION: VEGETATION REMOVAL

REVISION No.: FINAL

DATE: SEPTEMBER 2013

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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct vegetation removal during the activities at the Former Naval Air Station (NAS) Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation for the project area and will be used to direct vegetation removal and surface clearance operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:


  
\_\_\_\_\_  
Robert Hierhozler  
Project Manager


9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

 Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
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Date: 2013.09.25 17:14:51 -04'00'

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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## **7. PROCEDURES**

### **7.1 VEGETATION REMOVAL**

#### **7.1.1 Purpose**

The purpose of this SOP is to provide USA employees and subcontractors with the minimum procedures and safety and health requirements applicable to performing vegetation removal operations within the identified project areas.

#### **7.1.2 Scope**

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in conducting vegetation removal operations. This SOP is not a stand-alone document and should be used together with the other USA SOPs, the Accident Prevention Plan (APP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

#### **7.1.3 Training**

All training on equipment will be either formal or on-the-job (OJT) training. This training will be documented by site personnel and subject to review for accuracy and completeness. The UXO Quality Control Specialist (UXOQCS) will verify and document that personnel assigned to vegetation removal teams have received training on the equipment.

#### **7.1.4 Work Clothing and Field Sanitation**

Work clothing will be appropriate for the conditions encountered. In most cases, this will be Level D personal protective equipment (PPE), which includes the following:

- Boots used during chainsaw de-vegetation activities must be constructed with cut-resistant material which will protect the employee against contact with a running chain saw, in accordance with 29 CFR 1910.266(d)(1)(v).
- Chainsaw Chaps
- Head protection, in accordance with 29 CFR 1910
- Face protection, in accordance with 29 CFR 1910
- Coveralls or work clothing as prescribed
- Work gloves, leather or canvas as appropriate
- Safety Glasses
- Dust mask, as required by wind conditions and/or the presence of airborne particulate matter
- Other PPE as needed. (e.g., hearing protection, noise attenuators or ear plugs, etc.)
- In no case will tennis/running shoes or abbreviated attire such as tank tops or shorts be permitted.

The team will be outfitted with field decontamination equipment, which will consist of containers of wash water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.



### **7.1.5 Team Composition**

Vegetation removal may be conducted by a subcontractor specializing in vegetation removal or by USA UXO technicians or a combination of the two. If subcontracted the subcontractor equipment operators require UXO escort by a minimum UXO TII.

The USA Vegetation Removal Team will consist of a minimum:

- UXO Technician III (1)
- UXO Technicians II or I (3)

During the instrument verification strips (IVS) installation and the placement of blind seed items (BSI), minimal vegetation removal may need to be performed. A dedicated vegetation removal team structure will not be used; rather, one or two UXO qualified personnel, as necessary, will conduct the limited vegetation removal to facilitate the IVS installations and BSI placement. The UXO personnel conducting vegetation removal will be integral to the installation or placement teams. With the exception of the team structure, all operational procedures provided in this SOP will apply.

#### **7.1.5.1 UXO Technician III**

The UXO Technician III (Team Leader) will be UXO qualified and will direct the operation and other team personnel within the context of removal requirements. In addition, the UXO Technician III must be familiar with the equipment being utilized.

#### **7.1.5.2 Operator**

The operator(s) of powered equipment will be qualified and trained on the equipment that they are utilizing (e.g., tree removal equipment, chain saws, power trimmers, other manually-operated cutting tools, and wood chipping equipment). These personnel do not need to be UXO qualified and will receive the appropriate formal training and OJT in order to operate the equipment in a safe and efficient manner. The operator performs daily inspections and maintenance functions as recommended in the operator's manual. The operator will perform other duties as needed or directed.

### **7.1.6 Safety**

Safety is paramount and all personnel will observe those safety precautions/warnings that apply or may apply to vegetation removal operations. The precautions listed below are general in nature and personnel will need to review applicable publications for more specific safety precautions/warnings. Distances listed are the minimum required.

- Maintain a Team Separation Distance (TSD) from other teams; as described in the Hazard Control Briefing in Section 8.1.
- Use equipment safety features.
- Observe safety precautions/warnings found in the operator's manual/manufacture's publications.
- Maintain 6 inches of ground clearance during vegetation cutting operations.
- Maintain communications between the Team Leader and equipment operator(s) at all times.
- Maintain site control.
- Observe munitions and explosives of concern (MEC) safety precautions for items encountered or suspected.

Ensure the PPE is appropriate for the task, serviceable, and worn/used properly.

### **7.1.7 Operational Procedures**

The UXO Technician III will be responsible for the direction and manner in which the vegetation is to be removed. Prior to removal operations commencing, a visual search/survey will be conducted to determine the hazards that may be encountered, which may include material potentially presenting an explosive hazard (MPPEH), terrain slope, vegetation, wildlife, environmental concerns. Adherence to PPE requirements will also be visually checked. The UXO Technician III will perform a visual search for MPPEH, surface debris, and any other obstruction/object that may pose a hazard to team personnel. Hazardous items, impassable terrain, or vegetation that may affect operations will be marked and team personnel notified.

Prior to operations commencing, a communications check with all team personnel will be conducted. Hand signals will be devised and used as a means of communication. All team personnel must know these hand signals prior to operations commencing. The hand signals will be documented on the tailgate safety briefing sheet each morning of operations and at each change of team personnel.

Personnel will not enter within 10 ft of an operating piece of hand-held vegetation removal equipment. If at any time personnel enter closer than 10 ft, the operator will immediately stop, return the engine to idle speed, and cease operations.

Team personnel are to ensure that a 6-in ground clearance is maintained during removal operations. Those areas marked as hazards are to be avoided. The manner in which operations are accomplished will follow safe work practices and procedures. Areas of concern will be marked and addressed to the Senior UXO Supervisor (SUXOS) and/or UXO Safety Officer (UXOSO) as needed. All MPPEH items encountered will be marked with a red pin flag and avoided. Notification of these items will be made to the SUXOS and the UXOSO.

## **7.2 QUALITY CONTROL**

The vegetation removal and surface clearance teams will meet the quality control (QC) metrics listed on the attached QC Surveillance check sheet.

The UXOQCS will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any grid the UXOQCS determines does not meet the quality control metrics will be considered deficient or non-conforming. If the deficiency or non-conformance cannot be resolved immediately, the UXOQCS will prepare a non-conformance report and submit to the SUXOS. The UXOQCS will conduct an analysis of the cause of the deficiency or non-conformance and prepare and submit a response to the Project Quality Control Manager and the Project Manager within 48 hours.

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**8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF**

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting vegetation removal activities, along with methods to mitigate the hazards.

**Table 1: Hazard Analysis Matrix**

<b>Activity</b>	<b>Hazard</b>	<b>Triggering Events</b>	<b>Initial Risk Index</b>	<b>Hazard Mitigation</b>	<b>Final Risk Index</b>
Vegetation Removal and Surface Clearance	Slips, Trips or Falls	Climbing; debris, holes or crevasses obstructed from view by vegetation.	C/III/4	Assess surroundings prior to proceeding with field activities. Ensure footing at all times.  Wear leather safety toe work boot with ankle support and non-slip soles.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear  Keep feet dry (carry extra socks).  Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Hot Weather	Seasonal weather patterns.	C/III/4	Monitor heat stress; provide cool drinking water, work-rest schedule, and cool shelter for breaks.	D/IV/5
	Biological	Biting/stinging insects, spiders, rodents and hazardous plants.	C/III/4	Avoid biological hazards.  Wear long sleeve garments and apply repellent to clothing and exposed skin as needed.  Use barrier cream, as necessary.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the TSD between teams (see the hazard control briefing that follows)  All personnel will receive a safety briefing prior to commencing site activities  A UXO-qualified person will locate an anomalous-free area with the metal detector prior to placing a pin flag into the ground.  Mark all MPPEH items with a red pin flag for later assessment by the SUXOS and the UXOSO	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Equipment	Use of equipment.	C/II/3	Follow appropriate lifting/carrying procedures. Vegetation removal crew will maintain a distance of at least 20 ft from each other. Chainsaw engines will be started and stopped when all co-workers are clear of the saw. Chainsaws will be properly supported when in use. Operator will shut off saw when carrying chainsaw over slippery surfaces, through heavy brush, and when adjacent to personnel. Never use chainsaw above shoulder height. Use of required PPE.	D/III/5
	Fire	Fueling equipment and smoking cigarettes.	C/II/3	Never fuel equipment in back of a truck with a bed liner. Do it on the ground. Use bonding/grounding when transferring flammable liquids. No smoking within 50 feet of fueling operations. No smoking except in designated smoking area equipped with sand-filled bucket for cigarette butts and fire extinguisher.	D/III/5
	Sunburn	Work in outdoor environment.	B/IV/4	Use sunscreen and wear hard hat.	C/IV/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

### 8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader on the existing and potential hazards within the project area prior to commencing any activities.

Personnel will be cognizant of their surroundings at all times and remain observant of their footing as they traverse the project area. All personnel will be aware of the signs of heat and cold stress as described in

Section 9.14 of the APP and be able to recognize the onset of cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects. Areas west of the pond have previously undergone a surface clearance. The wooded areas east of the pond have not. The potential for encountering MPPEH is moderate. Maintain the TSD as follows:

- 23-ft based on the K40 distance for the 40-mm Mk2 projectile, (primary)
- 50-ft based on the K40 distance for the 90-mm M71 projectile, (contingency)

If a munitions item with larger fragmentation distance is encountered, work will be stopped in order to modify the Explosives Safety Submission (ESS).

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the SHSP.

## **9. DIAGRAMS**

Site maps are located in Appendix A of the WP. Teams will be provided maps of the overall project site and evacuation routes.

## **10. EQUIPMENT**

The UXO technician providing MEC avoidance escort services will be equipped with the following:

- Handheld all-metals detector
- Weed eaters with metal blades
- Pin flags for marking suspected MPPEH items
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment.

The required safety equipment includes the following:

- First-aid kit
- Level D PPE
- Hearing protection
- Face shields
- Inclement weather gear, as needed.

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SHSP, Section 10.2 will be followed. A copy of the SHSP is maintained in all project site vehicles.

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**

**N62470-11-D-8007 CTO WE01**

**VEGETATION REMOVAL**

TEAM INFORMATION		
Team:	Location:	Date:
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	SOP 2 Workers' Statement	Have all Vegetation Removal and Surface Clearance Team Members read this SOP?				(P)
2	SOP 2, Sec. 7.1.5.2	Are all Vegetation Removal Team Members trained and qualified to operate removal equipment?				(P), (I), (F)
3	SOP 2, Sec. 6	Is the PPE serviceable and properly worn by all team members?				(P), (I), (F)
4	SOP 2, Sec. 7.1.7	Did team maintain 6 inches of ground clearance during vegetation cutting operations?				(P), (I), (F)
5	SOP 2, Sec. 7.1.7	Are team members remaining 10-ft away from operating handheld powered cutting tools?				(P), (I), (F)
6	SOP 2, Sec. 7.1.7	Were all MPPEH items marked with a red pin flag?				(P), (I), (F)
7	Sec 8.1	Was the EZ established and the TSD for the project area observed?				P), (I), (F)

FINDINGS	
Item	Comments

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

PROCEDURE No.: SOP 2

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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**SURFACE CLEARANCE**

**SOP 3**

MEC Remedial Investigation

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013



PROCEDURE No.: SOP 3  
DESCRIPTION: SURFACE CLEARANCE  
REVISION No.: FINAL  
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PROCEDURE No.: SOP 3  
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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Project Work Plan (WP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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### 3. ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
DGM	Digital Geophysical Mapping
DU	Decision Unit
EM	Engineer Manual
EMT	Emergency Medical Technician
ESQD	Explosive Safety Quantity Distance
ESS	Explosives Safety Submission
MEC	Munitions and Explosives of Concern
MGFD	munitions with the greatest fragment distance
MPPEH	Material Potentially Presenting an Explosive Hazard
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant(s)
PPE	personal protective equipment
SOP	Standard Operating Procedure
SHSP	Site Health and Safety Plan
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WP	Work Plan

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ATTACHMENT 1: MEC DAILY ACTIVITIES CHECKLIST

ATTACHMENT 2: MEC EQUIPMENT CHECKLIST

ATTACHMENT 3: CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG

ATTACHMENT 4: PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST and QC SURVEILLANCE

PROCEDURE No.: SOP 3  
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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct surface clearance operations at areas containing material potentially presenting an explosive hazard (MPPEH) that will be conducted at the Former Naval Air Station (NAS) Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at Brunswick and will be used to direct geophysical survey operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:


  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charlie Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:10:35 -04'00'

\_\_\_\_\_  
Date

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## 5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the clearance described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Brian Thompson

Date

Senior Unexploded Ordnance (UXO) Supervisor

## 6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

[illegible]

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## **7. PURPOSE**

The purpose of this SOP is to provide procedures for surface clearance for removal of metallic debris from the ground surface where DGM is to be conducted and where previous surface clearance was not performed. These procedures will be conducted in accordance with the Work Plan (WP), the Site Health and Safety Plan (SHSP) and the Explosives Safety Submission (ESS). These procedures are general in nature and may be refined with the concurrence of the Senior UXO Supervisor (SUXOS) to adapt to specific site conditions and circumstances.

## **8. SCOPE**

The procedures described in this SOP are intended to provide a safe environment for personnel performing surface MEC clearance, subsurface MEC investigations, and subsequent geophysical mapping. Specific requirements for vegetation clearance are addressed in SOP 2.

## **9. DAILY PLANNING**

### **9.1 DAILY BRIEFING**

At the beginning of each work day, the SUXOS or his/her designee will hold a daily briefing in accordance with the requirements of the approved WP. At a minimum, this briefing will include the following:

- Work assignments
- Site Specific Explosive Safety Quantity Distance (ESQD)
- Team separation distances
- Entry and control points
- Review of emergency procedures
- Review of ordnance safety
- Review of communications procedures and equipment
- Review of any site-specific hazards and the measures that will be used to mitigate those hazards
- Review of environmental and archaeological concerns
- Procedures for coordination of intrusive investigation work with personnel performing non-MEC activities.

Other issues will be discussed during the briefing as necessary to support safe and efficient operations. The SUXOS will document the daily briefing in his/her logbook and will obtain the signatures of those attending the briefing on a daily briefing attendance sheet. During the daily briefing, the SUXOS will also assign work sites to each of the UXO teams for intrusive operations. Each UXO Team Leader (TL), UXO Technician III, will receive a map and any other data necessary to perform the assigned work. The SUXOS will complete the top portion of the MEC Daily Activities Checklist (Attachment 1) and give it to the TL. The top portion of this checklist verifies that the TL has received the necessary information to support the daily activities, information on utilities that may be present in the project area and daily briefing and safety information. The TLs will brief their team on potential hazards in the area where they will be working and will document the briefing on the MEC Daily Activities Checklist, as well as on the Tailgate Safety Briefing Form in the Accident Prevention Plan (APP). Work assignments, equipment inspections, and other routine daily activities will be documented on the MEC Daily Activities Checklist as well.

## 40 9.2 TAILGATE SAFETY MEETING

41 After arriving at the worksite, the TLs will conduct tailgate safety briefings to cover work assignments,  
42 procedures, and hazards specific to that site. The daily briefing may serve as the tailgate briefing if the  
43 content covers those additional issues normally reserved for discussion during the tailgate briefing. If the  
44 daily briefing is combined with the tailgate meeting, it will include:

- 45 • Review of site task assignments for the day
- 46 • Review of instrument function test procedures/requirements
- 47 • Review of task-specific hazards for that site
- 48 • Review of environmental considerations
- 49 • Review of any other task- or location-specific information needed to safely complete the assigned
- 50 daily work.

## 51 10. SURFACE CLEARANCE

52 The primary purposes for this instrument-aided surface clearance are to reduce the amount of metallic  
53 surface items prior to conducting digital geophysical mapping of the sub-surface, determine the horizontal  
54 extent of MEC within the project area, and to rid the site of surface MEC in order to reduce risk to the  
55 public and investigative teams. Horizontal extent is considered as defined when the clearance team has  
56 cleared for 50 feet in all directions since the last MEC find without finding an additional MEC item.

### 57 10.1 PERSONNEL REQUIREMENTS

- 58 • Each intrusive investigation team will be comprised of up to 5 members: a TL and any  
59 combination of UXOTII/I.
- 60 • Intrusive investigation activities will not be conducted until the required training (both general and  
61 site-specific), and proper equipment/vehicle checks, have been completed.
- 62 • Intrusive investigation operations will not be initiated until an appropriate Exclusion Zone (EZ) is  
63 established based on the munitions with the greatest fragment distance (MGFD), and in  
64 accordance with the approved Explosives Safety Submission (ESS).

65 The SUXOS will be notified of all MEC finds. The following sections discuss various elements of the  
66 intrusive process.

### 67 10.2 EQUIPMENT/MATERIAL REQUIREMENTS

68 Each TL will inspect the equipment to be used prior to commencing operations each day, to ensure that  
69 proper tools and equipment are available. Required field equipment is listed in Attachment 2.

### 70 10.3 SURFACE CLEARANCE

71 When approval to begin the surface clearance is received, the team will enter the project area. The team  
72 will form a line abreast, spaced in a manner that permits clear visual examination of the ground surface.  
73 The team member on one end of the line will act as the guide and navigate a straight path along a  
74 marked boundary line, which will be established along the 100 ft x 100 ft grids. The team will maintain  
75 even spacing and alignment with the guide. The team member on the opposite end of the line will mark  
76 the border of each swath observed in a manner that provides a clear delineation of the clearance  
77 boundary. The SUXOS will determine which technique will be used to mark the clearance boundaries  
78 (line, marking flags, cones, and so forth). The marked boundary will guide the next pass as the clearance  
79 progresses. All team members will sweep, using the hand-held metal detector, in small arcs in front of  
80 them as they proceed to identify metallic objects on or under the surface. For Brunswick the hand-held

detectors will be all metals detectors, such as the Whites DFX 300 or Mine-Lab. This process will be followed until clearance of all selected areas is complete.

If any potential MEC and MPPEH is located, the following actions will be taken:

- The SUXOS will be notified immediately and will inspect the item, to confirm the identification.
- Characterization data for MEC and other items found will be recorded by the TL on a Clearance Data & Munitions Accountability Log (Attachment 3). The TL will record additional data (weather conditions, issues affecting equipment, schedule, etc.) concerning the clearance operations in the TL field log.
- The SUXOS will verify the disposition of MEC items by completing the bottom portion of the Clearance Data & Munitions Accountability Log.

The TL will inform the SUXOS when surface clearance activities are completed. At the end of each day, the TL will complete the remaining items on the Daily Activities Checklist, to document successful completion of required activities. The completed checklist will be submitted to the SUXOS for review and, if necessary, correction. The checklist will then be placed in the on-site project files.

#### **10.4 ANOMALY REPORTING**

The TL will record recovered anomaly data on the Clearance Data and Munitions Accountability Log. In the field, the UXO team will complete all fields on the top portion of the form. If information is not known or a field is not applicable to an anomaly (e.g., Munitions Mark/Mod), so indicate in the field, and do not leave fields blank. The TL will check each form for completeness and will turn them over to the SUXOS daily.

The TL or SUXOS utilizes a ruggedized Personal Digital Assistants (PDA), using pull-down menus to record each MEC or MPPEH item encountered by the surface clearance team. The TL and SUXOS will photograph MEC and each piece of MPPEH recovered, and the items will be annotated on the Clearance Data and Munitions Accountability Log to further document the item.

PDA data will be transmitted to the Data Manager at the end of the day. The Data Manager will check the data for completeness and accuracy, download the data to the project database, and upload the PDA with the next day's data.

For other debris including non-munitions related items, an entry should be made on the Clearance Data and Munitions Accountability Log with description and total weight of materials collected for each grid cleared.

.

All Clearance Data and Munitions Accountability Logs, digital photographs, and checklists will be turned over to the SUXOS at the end of each working day without exception. It is critical that data not be compromised through loss or improper handling. The SUXOS will identify errors in the forms, have the TL correct the errors, and turn the forms over to the Data Manager for entering into the project database.

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#### **ATTACHMENT 1.**

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#### **MEC DAILY ACTIVITIES CHECKLIST**

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PROCEDURE NO.: SOP 3DESCRIPTION: SURFACE CLEARANCEREVISION NO.: FINALDATE: SEPTEMBER 2013PAGE: 19 OF 34**MEC DAILY ACTIVITIES CHECKLIST****Project Information**

Project Name: \_\_\_\_\_ Date: \_\_\_\_\_

Project Location: \_\_\_\_\_ Team No. \_\_\_\_\_

Work Area: \_\_\_\_\_

**SUXOS Checklist items**

Name: \_\_\_\_\_

*Check Items Complete*

- ☐ Conduct daily briefing (safety, emergency procedures, munitions information, etc.).
- ☐ Make mandatory notifications prior to conducting field operations (fire, medical support, military offices, etc.).
- ☐ Notify team leader of utilities or other dangers.
- ☐ Assign project area and provide data package.

**UXO Team Leader Checklist Items**

Name: \_\_\_\_\_

*Check Items Complete*

- ☐ Ensure that all necessary data have been provided by the SUXOS for daily operations.
- ☐ Conduct vehicle inspection.
- ☐ Conduct tailgate safety briefing.
- ☐ Perform equipment inspections and operational tests (record in log book).
- ☐ Verify daily heavy equipment inspection.
- ☐ Identify known utilities.
- ☐ Ensure that project area is secure as required (road closures, exclusion zone set up, etc.).
- ☐ Notify site office of start time for ordnance operations.
- ☐ Ensure that all required data have been recorded (data sheets, log books, photo log, etc.).
- ☐ Ensure that required site restoration is complete.
- ☐ Notify site office of stop time for ordnance operations.

**Approvals**

SUXOS Signature: \_\_\_\_\_ Date: \_\_\_\_\_

UXOQC Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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**ATTACHMENT 2.**

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**MEC EQUIPMENT CHECKLIST**


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		MEC EQUIPMENT CHECKLIST
<b>Basic Equipment</b> (Required for all UXO work)		
✓	<b>Quantity</b>	<b>Item Description</b>
<input type="checkbox"/>	1	Metal detector (per team member)
<input type="checkbox"/>	1	Emergency eye wash
<input type="checkbox"/>	1	Fire extinguisher
<input type="checkbox"/>	1	First-Aid/trauma kit (equipped for white phosphorus burns)
<input type="checkbox"/>	TBD	Flashlight, as needed
<input type="checkbox"/>	1 pair	Gloves, leather (or other approved work gloves) (per team member)
<input type="checkbox"/>	1	Radios (2-way)
<input type="checkbox"/>	TBD	Pin flags (non-metallic)
<input type="checkbox"/>	3	Shovel, round point
<input type="checkbox"/>	2	Warning signs for exclusion zone
<input type="checkbox"/>	2 rolls	Caution tape
<input type="checkbox"/>	TBD	Tape, duct, as needed
<input type="checkbox"/>	TBD	Tape, plastic, as needed
<input type="checkbox"/>	1	Toolbox, general hand tools
<input type="checkbox"/>	1	Trowel
<input type="checkbox"/>	TBD	Water bottle, 1 liter, adequate supply for team members
<input type="checkbox"/>	--	Field log book and field forms (as appropriate)
<input type="checkbox"/>	1	Hand cleaner
<b>Site-Specific Items</b> (Write in items and quantity)		
✓	<b>Quantity</b>	<b>Item Description</b>
<input type="checkbox"/>		_____
<input type="checkbox"/>		_____
<input type="checkbox"/>		_____
<input type="checkbox"/>		_____

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### **ATTACHMENT 3.**

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### **CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG**


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		<b>CLEARANCE DATA &amp; MUNITIONS ACCOUNTABILITY LOG</b>		
<b>FOR UXO TEAM USE</b>				
Site Name:		Team Leader:		
Grid or Lane Number:	Work Area:		Date:	
Location: X (Lat): _____		Y (Long): _____		Location Type (UW or UG): _____
Other Location Information: _____				
Depth (feet): _____		Inclination (Degrees): _____		Orientation (N-S, E-W): _____
<b>TARGET/ANOMALY CHARACTERISTICS</b>				
Type of Target/Find: <input type="checkbox"/> Surface Find <input type="checkbox"/> Mag & Dig Target <input type="checkbox"/> Primary Geo Target <input type="checkbox"/> Validation (QA/QC) <input type="checkbox"/> No Dig				
Type of Anomaly: <input type="checkbox"/> MPPEH <input type="checkbox"/> UXO <input type="checkbox"/> MEC <input type="checkbox"/> Inert <input type="checkbox"/> Practice <input type="checkbox"/> Metallic Scrap <input type="checkbox"/> No Find* <input type="checkbox"/> Rock <input type="checkbox"/> Rust Layer <input type="checkbox"/> Abandon Dig* <input type="checkbox"/> Seed Items Recovered (By location, quantity and seed number):  <input type="checkbox"/> Misc.*				
*Comments:				
Diameter/Width:		Length:		Estimated Weight:
<b>DIGITAL PHOTO RECORD</b>				
Was photo taken?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Camera No.:	Frame No.:	File Name:

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## CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG

### MUNITIONS NOMENCLATURE (If known, record below; record fuze condition and disposition)

Munitions Mark/Mod:

Fuze Mark/Mod:

N.E.W. Total:

☐ Nose: \_\_\_\_\_ ☐ Tail:

☐ Transverse: \_\_\_\_\_ ☐ Casing: \_\_\_\_\_

### MUNITIONS CHARACTERISTICS

Munitions Filler: ☐ Explosive ☐ Inert ☐ Propellant ☐ Pyrotechnic ☐ Unknown  
☐ Other:

Munitions Category: ☐ Bombs ☐ Grenades ☐ Mortars ☐ Projectiles  
☐ Rockets ☐ Small Arms ☐ Land Mines ☐ Sea Mines ☐ Torpedoes  
☐ Clusters/Dispensers ☐ Guided Missiles ☐ Pyrotechnic/Flares ☐ Misc. Explosive Devices

### FUZE CHARACTERISTICS

Fuze Location(s) (check all that apply):

☐ Nose ☐ Tail ☐ Transverse ☐ Casing

Breaks in Fuze  
Body?

☐ Yes ☐ No

Fuze Markings:

Fuzing Type(s): ☐ Hydrostatic ☐ MT Long Delay ☐ Powder Train Time Fuze  
☐ Impact ☐ MT Superquick ☐ Pressure ☐ Nose MT/Tail Impact Inertia  
☐ Influence ☐ All-ways Acting ☐ Piezo-Electric ☐ Pt-initiating-Base-detonating  
☐ Electric ☐ Electric ☐ Base Detonating ☐ Proximity (VT)  
☐ Mech Time (MT) ☐ Point Detonating (PD) ☐ Nose MT/Tail Pressure

Fuze Length:

Fuze Diameter:

Diameter of Fuze Well:

### Comments:

### MEC STATUS & PHYSICAL CONDITION (Check all that apply)

☐ Armed ☐ Unarmed ☐ Fired ☐ Unfired  
☐ Intact ☐ Broken Open ☐ Filler Visible ☐ Soil Staining


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	<b>CLEARANCE DATA &amp; MUNITIONS ACCOUNTABILITY LOG</b>	
	<b>FOR SUXOS USE</b>	
Disposition: (Clarify Under Remarks) <input type="checkbox"/> Transferred <input type="checkbox"/> Transported <input type="checkbox"/> Left In Place <input type="checkbox"/> Destroyed <input type="checkbox"/> BIP <input type="checkbox"/> Other : _____		Date:
Client Notifications By:	Signature:	Date
Transferred To:	Signature:	Date:
Destroyed By:	Signature	Date:
Remarks: _____		
SUXOS Signature:		Date:

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**ATTACHMENT 4.**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**

**N62470-11-D-8007 CTO WE01**

**SURFACE CLEARANCE**

TEAM INFORMATION		
<b>Team:</b>	<b>Location:</b>	<b>Date:</b>
<b>Team Leader:</b>		
<b>Personnel Present:</b>		
<b>Phase of Inspection (Circle): Preparatory (P); Initial (I); Follow-Up (F)</b>		

CHECKLIST						
Item	Ref.	Inspection Point	Yes	No	N/A	Comments
1	SOP 3 Workers' Statement	Have all team members reviewed SOP 3, surface clearance?				(P)
2	MEC QAPP WS#7 & 8	Are all Surface Clearance Team Members qualified in accordance with MEC SAP WS #7 & 8?				(P), (I), (F)
3	SOP-3, Attach. 1	Has the SUXOS made all mandatory notifications prior to commencing operations?				(P), (I), (F)
4	MEC QAPP WS#17, SEC. 17.1	Was an EZ established by the SUXOS prior to beginning the clearance?				(P), (I), (F)
5	MEC QAPP WS#17, Sec. 17.1	Are Team Separation Distances maintained?				(P), (I), (F)
6	SOP-3, Attach. 2	Is all required equipment, in accordance with the listed reference, on hand and operational?				(P), (I), (F)
7	APP, SHSP	Are all team members properly outfitted with the appropriate PPE?				(P), (I), (F)
8	APP	Have all personnel read and signed all AHAs associated with the surface clearance?				(P), (I), (F)
9	SHSP	Have onsite and offsite communications channels been established prior to clearance activities commencing?				(P), (I), (F)
10	APP	Has the Team Leader conducted the Tail Gate Safety Briefing before beginning the surface				(P), (I), (F)



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CHECKLIST						
Item	Ref.	Inspection Point	Yes	No	N/A	Comments
		clearance?				
11	MEC QAPP, WS#17, Sec. 17.6	Are Archaeological Monitors on-site to conduct surveys to protect archaeological features?				(P), (I), (F)
12	MEC QAPP WS#17, Sec. 17.6	Are MEC team members maintaining proper spacing to ensure 100% surface clearance coverage of the AOC?				(P), (I), (F)
13	SOP-8	Are all recovered materials properly inspected, further classified and segregated in accordance with the listed reference?				(P), (I), (F)
14	MEC QAPP WS#17, Sec. 17.6	Are MEC items properly identified, marked and their location recorded for future disposal?				(P), (I), (F)
15	MEC QAPP WS#37	Are all surface seed items accounted for?				(P), (I), (F)
16	SOP-3, Attach. 3	Is the Team Leader completing all entries on the PDA or his portion of the Clearance Data and Munitions Accountability Log?				(P), (I), (F)
17	SHSP	Are personal hygiene and decontamination procedures followed?				(P), (I), (F)
18	EPP	Are Best Management Practices and good housekeeping procedures followed, to mitigate impacts to the project site?				(P), (I), (F)

FINDINGS	
Item	Comments

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166 Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

**1. TITLE PAGE**

Final

STANDARD OPERATING PROCEDURE

FOR

**DIGITAL GEOPHYSICAL MAPPING**

**SOP 4**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD  
FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 4  
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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern RI Work Plan (Quality Assurance Project Plan) (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C

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### 3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
AOC	Area of Concern
BC	Back Check
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
FTL	Field Team Leader
GPS	Global Positioning System
ID	Identification
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAS	Naval Air Station
NOSSA	Naval Ordnance Safety and Security Activity
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
POC	Point of Contact
PQCM	Program QC Manager
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SHSP	Site Health and Safety Plan
TSD	Team Separation Distance
USA	USA Environmental, Inc.
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist

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ATTACHMENT 1: EM61 AND DGPS OPERATION

ATTACHMENT 2: DGM CHECKLISTS

ATTACHMENT 3: TRANSECT DEVIATION CHECKLIST

ATTACHMENT 4: QUALITY CONTROL SURVEILLANCE CHECK SHEET



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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct digital geophysical mapping (DGM) activities at the former Naval Air Station (NAS) Brunswick located in Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at NASB and will be used to direct the DGM operations.

Developed by:

  
\_\_\_\_\_  
Alan Crandall  
Project Geophysicist

9/25/2013  
\_\_\_\_\_  
Date

Reviewed by:

  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/13  
\_\_\_\_\_  
Date

Validated by:

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA Environmental,  
Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:09:50 -0400

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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## 7. PROCEDURES

### 7.1 PURPOSE

The purpose of this standard operating procedure (SOP) is to provide procedures and technical guidance on performing DGM to collect data on targets for potential intrusive investigation during the munitions and explosives of concern (MEC) activities at the Site 12 EOD at former NASB in Brunswick, . The geophysical instrumentation will be used in conjunction with a real time kinematic (RTK) differential global positioning systems (DGPS) during the clearance. In addition, this SOP ensures that data will be acquired in a consistent manner during this clearance. It also identifies general quality control (QC) procedures to be performed by field personnel and verification points for use by the field QC staff.

### 7.2 SCOPE

This SOP outlines the procedures used for the collection of geophysical and associated coordinate data at the site. To support this activity, USA will use the Geonics EM61-MK2, a high-resolution time domain electromagnetic induction sensor capable of detecting both ferrous and non-ferrous metallic objects in conjunction with RTK-DGPS to detect subsurface metallic objects, potentially related to MEC.

### 7.3 PROCEDURES

The following set of procedures is subdivided into procedures for the RTK DGPS base station and procedures followed at the site for conducting DGM.

#### 7.3.1 RTK DGPS Base Station Procedures

The RTK DGPS base station will be set up on a known survey control point; using coordinates provided for the point (see Attachment 1). See Table 1 below for survey control and back check (BC) point locations. For this project, survey control is based on the Pier\_PK\_Nail. If cellular network RTK GPS correction signals are reliably available at NASB a network RTK rover may be used without a local base station.

**Table 1: USA Control Monuments**

NAD83 Maine State Plane Zone North US Survey Feet				
Monument	Easting (meter)	Northing (meter)	Elevation (US ft)	Comment
5440	3017120.378	378154.153	84.055	SPK
5441	3017496.195	378258.263	86.492	SPK

Unless a cellular network correction signal is used or a permanent full-time RTK DGPS base station is established, at the end of the day, deactivate RTK DGPS base station and radio modem. Disconnect and pack all equipment. Return to storage location. Recharge batteries.

#### 7.3.2 Digital Geophysical Mapping Procedures

The EM61-MK2 deployment method will be determined in the field and will depend on the terrain and accessibility. A towed array of three EM61-MK2 sensors will be the preferred configuration, over the man-portable configuration, wherever the terrain and site conditions are favorable.

### 7.3.2.1 Man-Portable

1. Mount the RTK DGPS rover antenna on the EM61-MK2 using the antenna mount. The antenna should be mounted and centered directly above the EM61-MK2 coil.
2. Turn on the EM61-MK2 and RTK DGPS rover units. Perform morning IVS QC tests (see Attachment 1 for equipment setup and operation and IVS checklist).
3. Proceed with the geophysical survey, without disassembly. Daily survey procedures include:
  - Sensor warm up for at least 5 minutes.
  - Sensor nulling and RTK DGPS input check.
  - Perform morning IVS QC tests (see Attachment 1). Transfer IVS data for morning evaluation and mobilize to production area. Null sensor. Note: The out of the Box Equipment Checklist (Attachment 2) is available for the Site Geophysicist, DGM Team Leaders, and the QC team to use as an additional troubleshooting tool, as necessary.
  - Input and record file name for survey.
  - Acquire survey data along longest area survey line or along site slope..
  - Monitor sensor, battery, and RTK DGPS periodically.
  - Mark outer coil coverage with plastic pin flag , sand bag, or other means of marking every 23 to 50-ft (7 to 15-m), additional marking may be needed based on complexity of the area or at the digression of the team lead.
  - Insure sensor overlap on adjacent transects, move marking guides to outer coil coverage.
  - Continue until area is completely covered, battery needs replacing (e.g. EM61-MK2 battery reaches <12.0 volts or data logger battery reaches last segment or RTK DGPS power light flashes), or a break is required. Change and charge batteries, as required.
  - Perform afternoon IVS QC tests (See attachment 1). Following these tests perform end-of-day tasks, including:
    - Download afternoon survey data with instrument checks.
    - Secure the EM61-MK2 and RTK DGPS equipment.
    - Charge all batteries overnight.
    - Scan or photocopy the logbook pages and transfer to the Site Geophysicist.
    - Submit data files to the Site Geophysicist.
    - Record the completed survey areas in the tracking log and/or report to the Site Geophysicist.
    - Provide the logbook pages to the field quality control (QC) staff for verification.
    - Plan next day's activities.
4. One member of the team will be responsible for maintaining the logbook. Record the following information in the logbook:
  - Survey area ID
  - Time survey started
  - Time survey completed
  - Names of team members
  - Weather conditions
  - Serial numbers of RTK DGPS rover unit and geophysical instrumentation

- File names for the digitally recorded data. Each page of the logbook will be dated, sequentially numbered, and identified by the logbook number; all entries will be signed. The assigned DGM team member will place photocopies of the logbook pages in the appropriate folder located in the processing center at the end of each work day.
- Height of EM61-MK2 coils above ground (if not standard 42cm height). The EM61-MK2 coils may be adjusted to be closer to the ground if this change would increase the signal to noise level for the targets of interest.

#### **7.3.2.2 Towed-Array**

1. Assemble the Towed-Array platform
2. Mount the RTK DGPS rover antenna using the antenna mount, and the three EM61-MK2s. The antenna should be mounted and centered on the array. Record any offset measurements for all EM61-MK2 to the RTK unit for positioning and processing purposes.
3. Turn on the EM61-MK2 and RTK DGPS rover units. Perform morning IVS QC tests (see Attachment 1 for equipment setup and operation and IVS checklist).
4. Proceed with the geophysical survey, without disassembly. Daily survey procedures include:
  - Sensor warm up for at least 5 minutes. Check all coils to ensure that they are secured well to prevent movement relative to the array platform.
  - Open MagLogNT and start new survey. If possible use either "Same hardware as last survey" or "Hardware setting of other survey" to automatically bring up the correct input parameters and devices for the towed array.
  - Verify all green lights are lit for each EM61-MK2 and the RTK.
  - Start data collection/logging which will create a new line. Verify data collection by making sure numbers below green lights are increasing. Data will continue to collect until logging is stopped.
  - Perform morning IVS QC tests (see Attachment 1). Transfer IVS data for morning evaluation and mobilize to production area. Null sensor. Note: The out of the Box Equipment Checklist (Attachment 2) is available for the Site Geophysicist, DGM Team Leaders, and the QC team to use as an additional troubleshooting tool, as necessary.
  - Input and record file name for survey.
  - Acquire survey data along longest area survey line or along site slope.
  - Monitor sensor, battery, and RTK DGPS periodically.
  - Mark outer coil coverage with plastic pin flag, sand bag, or other means of marking every 23 to 50-ft (7 to 15-m), additional marking may be needed based on complexity of the area or at the digression of the team lead.
  - Insure sensor overlap on adjacent transects, move marking guides to outer coil coverage.
  - Continue until area is completely covered, battery needs replacing (e.g. EM61-MK2 battery reaches <12.0 volts or RTK DGPS power light flashes).
  - One file can be continuously updated for the entire day if no problems are encountered. If MagLogNT unexpectedly quits for any reason, especially if it quits due to the computer shutting off, begin a new file. The unexpected quit writes bad data to the file that is extremely difficult to remove if it is stuck in the middle. It becomes much easier to deal with if it is at the end of the file instead.
  - Change and charge batteries, as required.



- Perform afternoon IVS QC tests (See attachment 1). Following these tests perform end-of-day tasks, including:
  - Download afternoon survey data with instrument checks.
  - Secure the EM61-MK2 and RTK DGPS equipment.
  - Charge all batteries overnight.
  - Scan or photocopy the logbook pages and transfer to the Site Geophysicist.
  - Submit data files to the Site Geophysicist.
  - Record the completed survey areas in the tracking log and/or report to the Site Geophysicist.
  - Provide the logbook pages to the field quality control (QC) staff for verification.
  - Plan next day's activities.
5. One member of the team will be responsible for maintaining the logbook. Record the following information in the logbook:
- Logbook will be maintained in a manner similar to that of Man-portable collection listed above.

### **7.3.3 Data Acquisition**

Both man-portable and towed-array DGM data will be collected along parallel lines using a 2.5-ft (0.762-m) line spacing. Due to the presence of uneven terrain, slopes, standing water, sensor tilt and human error, deviations from the 2.5-ft (0.762-m) line spacing are expected. DGM coverage will be evaluated as described in worksheet 12 of the QAPP using an instrument footprint of 3.28-ft (1.0-m).

## **7.4 DEVIATION FROM MAPPING PROCEDURES**

### **7.5 DEVIATION FROM GEOPHYSICAL SURVEY TRANSECT SPACING AND ORIENTATION WILL BE DETERMINED AND DOCUMENTED IN THE FIELD. FIELD DATA COLLECTION**

The field data collected includes the EM61-MK2 data, RTK DGPS data, and digital photographs..

#### **7.5.1 EM61-MK2 and RTK DGPS Data Collection and Recording**

EM61-MK2 data include all electronic geophysical instrument data produced during the DGM. RTK DGPS survey data include all electronic positional data produced during the mapping. Procedures for use of the EM61-MK2 and RTK DGPS units are provided in Attachment 1.

#### **7.5.2 Photographs**

Digital photographs will be taken of all geophysical survey areas. Digital photographs will also be taken to document site conditions and/or obstructions during geophysical surveying (e.g., standing water, debris, rocks, and trees). Each team will maintain a photo log in their field logbook. The date, time, and subject of each photograph will be recorded at the time the photograph is taken. The digital cameras and copies of the photo logs will be given daily to the Site Geophysicist for entry into the photo tracking form and will be uploaded to the project computer.

## **7.6 DGM FIELD DATA DELIVERABLES**

DGM team leaders or the Site Geophysicist will scan the log books and checklists and provide to the Site Geophysicist, along with copies of their daily QC and Production data files at the end of each work day. The Site Geophysicist reviews each deliverable for completeness, and notifies the field QC staff that the day's data delivery requirements, for each DGM team, have been met. If there are deficiencies in the daily DGM data deliverables, the Site Geophysicist will follow-up with the DGM team and correct the deficiency. The field QC staff provides a copy of their 3-phase inspection checklist.

### **7.6.1 Raw Data by Date for Processing Center**

All raw data to include log books and daily forms uploaded to the project ftp site within 24 hours of data collection. Data submittals arranged by date and team. Files and forms include:

- Raw data files (\*.R61, \*.M61, \*.N61, or \*.Survey)
- Scanned DGM Log Books (\*.pdf)
- Scanned DGM Survey Area Forms (\*.pdf)
- Survey area pictures (\*.jpg)
- Field IVS Tracking form (\*.xlsx)

## **7.7 QUALITY CONTROL**

The DGM teams will conduct and document the daily quality control tests listed in Subsection 7.7.1 and meet the QC metrics listed on the attached QC Surveillance check sheet in Attachment 4.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any DGM tasks the QC team determines do not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS, the DGM subcontractor, and QA. The DGM subcontractor will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours.

### **7.7.1 Daily Quality Control Tests**

The DGM team will set up the equipment, verify that all equipment has survived transportation and is operational, and perform the following daily quality control tests, at a minimum:

- Sensor warm up of at least 5 minutes each time the sensor is turned on
- Sensor nulling and RTK DGPS input check
- Acquire morning IVS and noise strip data as established by the Geophysical System Verification (GSV) Report (Measured responses are at least 75% of the initially recorded responses for items in IVS).
- The Site Geophysicist will transfer these morning QC tests (e.g. exchange memory cards or download data) while the DGM team begins production DGM. The QC tests will be examined for conformance to project metrics each morning. The Site Geophysicist notifies each DGM team leader of their Pass/Fail status each morning. Any failures will require equipment/personnel checks, replacement/repair, retesting prior to proceeding to production DGM, and re-collection of affected data.

- Acquire afternoon IVS and noise strip data as established by the Geophysical System Verification (GSV) Plan) Measured responses are at least 75% of the initially recorded responses for items in IVS).

## 8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 2) lists the existing and potential hazards associated with conducting the DGM task along with methods to mitigate the hazards.

**Table 2: Hazard Analysis Matrix**

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Digital Geophysical Mapping	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Lifting	Set up or tear down of array or EM61MK2		Ensure that you, and if there is another individual assisting you, both have solid footing, leather work gloves and use the proper lifting technique, bend at the knees keeping your back as straight as possible and lift with your knees, not your back. Ensure you have good visibility in the direction you are carrying an item. Do not attempt to carry anything by yourself in excess of 50 lbs. or any item that blocks your visibility or is cumbersome to carry alone.	
	Power/Hand Tools	Set up or tear down of array or EM61MK2		Use the proper tools for the specific job being performed. Be certain that the tools to be used are serviceable and free of slippery surfaces.	
	Pinching	Set up or tear down of array or EM61MK2		Wear leather gloves and place hands on smooth surfaces checking the area on which you are going to place your hands to avoid sharp areas and pinch points.	

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Vehicle traffic	Set up or tear down of array or EM61MK2, DGM collection		Be aware of any vehicles or heavy equipment in the area, wear safety glasses and high visibility safety vest if applicable.	
	Towing	DGM collection or transporting tools or equipment		The trailer will be "chocked" with approved devices when unhooked from the transporting vehicle. Use of "ground guides" will be used, when vehicle(s) are not equipped with an audible warning device and/or has an obstructed view. When attempting to hook onto the trailer, "ground guides" will not place any part of between the trailer and vehicle.	
	Cold/Hot/WetWeather	Seasonal weather patterns	C/III/4	All site activities must ensure that appropriate clothing and PPE is worn to assist in the prevention of cold and heat stress injuries.  Use the buddy system at all times and have sufficient and appropriate fluids available for the conditions.	D/IV/5
	Biological	Biting/stinging insects (bees, wasps, black widow, hobo spiders , rodents and mosquitoes); contact with Poison Ivy, Poison Oak	C/III/4	Wear long sleeve garments, leather gloves and safety glasses and apply repellent to exposed skin as needed  Do not touch poison ivy or poison oak, it can cause severe blistering, apply protective barrier cream at the beginning of each day if available, wash frequently and change exposed clothing; see the APP for descriptive information  Avoid rodents and their droppings; if droppings are encountered in an area that will be utilized over an extended period, disinfect the area as detailed in the APP.	D/IV/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Material Potentially Presenting an Explosive Hazard (MPPEH)	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	All personnel will receive a safety briefing prior to commencing site activities  A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort.  UXO-qualified person will locate an anomalous-free area with the metal detector, prior to placing a pin flag into the ground.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

### 8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader, on the existing and potential hazards within the site prior to commencing any activities in the site.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the site. All personnel shall be aware of the signs of cold or heat stress as described in Section 9.14 of the APP and be able to recognize the onset of cold or heat stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects. All personnel will maintain the team separation distance (TSD) of 23-ft, which is based on the K40 distance for the 40-mm projectile.

If a munitions item with larger fragmentation distance is encountered, the TSD will be adjusted to the K40 distance of the item encountered.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Health and Safety Plan (SHSP).

## 9. DIAGRAMS

Site maps of the site are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

## 10. EQUIPMENT

The teams conducting DGM operations will be equipped with the following:

- RTK DGPS
- EM61-MK2
- Logbooks for recording data
- Camera
- Communications equipment
- UTV
- Truck

Safety equipment required includes the following:

- First-aid kit
- Level D Person Protection Equipment
- Inclement weather gear as needed

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SHSP, Section 10.2, will be followed. A copy of the SHSP is maintained in all project site vehicles.

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**ATTACHMENT 1.**  
**EM61-MK2, TOWED ARRAY, AND DGPS OPERATION**



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## **EM61-MK2, TOWED ARRAY, AND RTK DGPS OPERATION**

The following is intended to provide general instructions for data acquisition with a towed array of EM61-MK2 geophysical instruments coupled to an RTK DGPS system. As various independent government contractors use a variety of RTK DGPS systems, the setup and collection of RTK DGPS data will vary with each system. The manufacturer's instruction manual should be consulted in these situations.

The following procedures are provided to assist in establishing a consistent data acquisition process. The procedures will be adhered to during data acquisition activities to ensure that the data collected are of sufficient quantity and quality to meet the program objectives. The Site Geophysicist is responsible for ensuring that these guidelines are followed, and that the data acquisition staff is adequately trained to operate the equipment.

### **RTK DGPS Equipment and Set-up**

As each independent government contractor may use various RTK DGPS systems, the setup and collection of RTK DGPS data will vary with each system. The manufacturer's instruction manual should be consulted in these situations. Check base station setup by reoccupying and measuring a known point with at least one rover receiver each morning. Each measured location should be within 0.328-ft (10-cm) from the known location.

### **EM61-MK2 Man-Portable Setup:**

1. Assemble coil assemblies
2. Attach wheels and handle or stretcher [as demonstrated at the Instrument Verification Strip (IVS)]
3. Attach rover GPS antenna mount and mount rover GPS
4. Connect upper coil to lower coil connector or attach shorting plug for bottom coil only
5. Attach battery to electronics console
6. Connect coil cable to electronics console
7. Connect data cable to electronics console and Data Logger COM1
8. Connect GPS to EM Data Logger COM2
9. Move to an electromagnetically clean area
  - a. Set the EM61-MK2 Mode Switch to:
    - i. 4 – for logging four (4) bottom coil time gates
  - b. Set the Master/Slave Switch to M for single sensor operation
  - c. Push In the Circuit Breaker on the EM61-MK2 electronics console and warm up for at least 5 minutes. Note: the Master/Slave switch may be used to turn the EM61-MK2 On and Off.
  - d. Turn on Rover GPS
  - e. Push the ON/OFF button to turn on the Data Logger
    - i. Set Antenna Coil Size (e.g. Standard 1 x .5-m)
    - ii. Set Up Logger
      1. Date
      2. Time
      3. Units (e.g. feet)
      4. COM port (e.g. COM1)
      5. Audio
      6. Pause Key: (e.g. Alt F1 or any key)

7. Display (e.g. Text or Graphic)
8. Data acquisition rate (e.g. 14 Hz)
- iii. Set GPS Port
  1. GPS Input: (Enabled)
  2. COM Port (COM2)
  3. Baud Rate: (9600 or higher)
  4. Parity: (No)
  5. Data Bits: 8
  6. Stop Bits: 1
  7. Can monitor GPS data in terminal mode
- iv. Set Output Port – Not used unless logging data to external PC
- f. Monitor/Null Coils – After 5 minute warm-up, null EM61-MK2 – all channels should be close to  $0 \pm 1\text{-mV}$
- g. Acquire Data:
  - i. Create File (see data logger software manual)
  - ii. Survey Setup (see EM61-MK2 manual) with Reads per second = 10 or greater
  - iii. LOG DATA
    1. Wait for data display (0 to 100% internal calibration)
    2. Observe time gate values
    3. Observe DGPS input (observe toggle bar and correction status for letter D, letter A is unusable GPS)
    4. Enter to log data– System is ready to log data. Move to start of survey line.
- h. When coil is centered over start point, press ENTER again. Display will show “logging” on the top display line. Observe coil readings. Observe Station Number (STN). Note any unusual recordings on Field Survey Sheet.
- i. Walk along survey line slowly (about 2.5 to 3 feet per second). Periodically observe Data Logger display. Note any unusual recordings, any deviations from the survey line, or any observed surface metal objects. Escort should log these observations and marks the outer coil edge with plastic pin flags or sand bags to insure sensor overlap on a return transect.

If fiducial marks are available, press thumb button when coil is centered over mark for 1 second.

- j. Press Pause Key (e.g. Alt F1 or Any Key) when coil is centered over the line end to stop logging EM61-MK2 data.  
If in the Auto mode, simply continue to next line and keep moving until survey session is complete or manually set new lines.
- k. When survey is complete, exit logging. Enter a new file name to continue surveying, or return to main menu to transfer data.

- l. Data Transfer (may vary with controller-see manufacturer’s owner manual).

#### 10. Data Management in Data Logger

- a. Once data transfer is complete and data has been positioned, exported (\*.xyz file), and processed successfully, clear the data logger memory

11. Daily IVS Check

- a. Set up as above
- b. Acquire line 0 from start to end directly over the IVS center line.
- c. Increment the line number and acquire line 1 from end to start along the IVS noise strip.

**EM61-MK2 Towed Array Setup:**

1. Assemble the towed array platform.
2. Attach wheels
3. Attach rover GPS antenna mount and mount rover GPS
4. Attach the three EM61-MK2 coils
5. Measure offset of the center of the coils to the center of the GPS antenna
6. Attach battery to electronics consoles
7. Connect the sync cable to the electronic consoles
8. Connect coil cable to electronics console and coil
9. Connect data cable to electronics console
10. Connect data cables to computer (through USB converter if necessary)
11. Move to an electromagnetically clean area
  - a. Set the EM61-MK2 Mode Switch to:
    - i. 4 – for logging four (4) bottom coil time gates
  - b. Set the Master/Slave Switch to M on one of the three consoles, and S on the other two.
  - c. Push In the Circuit Breaker on the EM61-MK2 electronics consoles and warm up for at least 5 minutes. Note: the Master/Slave switch may be used to turn the EM61-MK2 On and Off.
  - d. Turn on Rover GPS
  - e. Open MagLogNT and start new survey. If possible, use either “same hardware setting as last survey” or “hardware setting of other survey” to automatically bring up the correct input devices for the towed array. The device windows at the top of the screen should have green lights in them if data is being received from the device. Start computer and run the MagLogNT program.
  - f. No data is being collected until File/Start Logging (or ctrl+s) is selected. Once selected, a new line is started in the data file, and the numbers immediately under the green status lights for each device should start increasing, indicating the size of the file for each device. File/Stop Logging (or ctrl\_e) ends data collection, but does not quit the survey. Start logging again starts a new line in the data file.
  - g. Collect field data. One File can be continuously updated for the entire day if no problems are encountered. If MagLogNT unexpectedly quits for any reason, especially if it quits due to the computer shutting off, begin a new file.
12. Data Management in computer
  - a. Once data transfer for each file (GPS, 1<sup>st</sup> coil, 2<sup>nd</sup> coil and 3<sup>rd</sup> coil) is complete the files will be run through MagMap software to be extracted along with the offsets recorded earlier to be used for processing.

13. Daily IVS Check

- d. Set up as above
- e. Acquire line 0 from start to end directly over the IVS center line.
- f. Increment the line number and acquire line 1 from end to start along the IVS noise strip.

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**ATTACHMENT 2.  
DGM CHECKLISTS**

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### CHECKLIST FOR OUT OF BOX EQUIPMENT TESTS

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Contractor POC: \_\_\_\_\_

Equipment Source: \_\_\_\_\_

Equipment Serial Numbers: \_\_\_\_\_

Reviewer's Name and Title: \_\_\_\_\_

Date of Review: \_\_\_\_\_

	Y	N	N/A
--	---	---	-----

1. Has the equipment been inventoried and inspected for damage or wear?

2. Has the cable shake test been performed?  
(Replace any faulty components if necessary)

3. Have the following instrument function tests been successfully performed:

Background values: TG1\_\_\_\_\_, TG2\_\_\_\_\_, TG3\_\_\_\_\_, TG4\_\_\_\_\_

Response values: TG1\_\_\_\_\_, TG2\_\_\_\_\_, TG3\_\_\_\_\_, TG4\_\_\_\_\_



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**ATTACHMENT 4**  
**QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**

**N44255-12-C-3003**

**DIGITAL GEOPHYSICAL MAPPING**

TEAM INFORMATION		
<b>Team:</b>	<b>Location:</b>	<b>Date:</b>
<b>Team Leader:</b>		
<b>Personnel Present:</b>		
<b>Target List:</b>		
<b>Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i></b>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	SOP 02 Workers' Statement	Have all DGM Team Members reviewed SOP 02?				(P)
2	QAPP WS#7 & 8	Are all Team Members trained and qualified to operate the equipment?				(P), (I), (F)
3	SOP 02, Sec. 7.3.1	Was the RTK DGPS base station setup on a known survey control point?				(P), (I), (F)
3A	SOP 02 Sec. 7.3.1	Did the daily RTK DGPS Reoccupation test measure a second known survey control point within 0.328-ft (10cm)?				(P), (I), (F)
4	SOP 02, Sec. 7.3.1	Were the morning and afternoon IVS checks performed?				(P), (I), (F)
5	SOP 02, Sec. 7.3.2	Were the AOC location procedures followed?				(P), (I), (F)
6	SOP 02, Sec. 7.3.3	Were overlapping survey lines spaced every 2.5-ft. (0.75-m) used to map the AOC?				(P), (I), (F)
7	SOP 02, Sec. 7.3.3	Were areas inaccessible to DGM documented in the positioned sensor data maps?				(P), (I), (F)
10	SOP 02, Sec. 7.4	Was a photographic record made of any deviations?				(P), (I), (F)
11	SOP 02, Sec. 7.5.1 & Att. 2	Were the checklists in Attachment 2 used to document the DGM activities?				(P), (I), (F)
12	SOP 02, Sec. 7.5.2	Were photographs of geophysical survey areas taken?				(P), (I), (F)

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CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
13	SOP 02, Sec. 7.5.2	Were the date, time and subject of each photograph recorded at the time the photograph was taken?				(P), (I), (F)
14	SOP 02, Sec. 7.6.1	Were the Field Data Submittals made?				(P), (I), (F)

FINDINGS	
Item	Comments

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

**1. TITLE PAGE**

Final

STANDARD OPERATING PROCEDURE  
FOR  
**GEOPHYSICAL DATA PROCESSING AND INTERPRETATION**  
**SOP 5**

MEC REMEDIAL INVESTIGATION  
SITE 12 EOD  
FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 5  
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## **2. REFERENCES**

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C

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### 3. ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BSI	Blind Seed Item
CD	Compact disc
CQC	Contractor Quality Control
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
DQO	Data Quality Objective
EMI	Electromagnetic Induction Survey
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
FTL	Field Team Leader
GIS	Geographic Information System
GPS	Global Positioning System
GSV	Geophysical System Verification
HE	High Explosive
IVS	Instrument Verification Strip
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAS	Naval Air Station
NAVFAC	Naval Facility Engineering Command
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
POC	Point of Contact
PQCM	Project QC Manager
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SSHPP	Site Safety and Health Plan
Std. Dev.	Standard Deviation
TDEM	Time-Domain Electromagnetic

USA	USA Environmental, Inc.
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
WMP	Waste Management Plan

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**ATTACHMENT 1. CHECKLIST FOR DATA PROCESSING**

**ATTACHMENT 2. GRID DATA DELIVERY CHECKLIST**

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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH), geophysical data processing and interpretation activities at the former Naval Air Station (NAS) Brunswick located in Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation and will be used to direct geophysical data processing and interpretation operations. The Site Geophysicist, in collaboration with the field QC staff, is responsible for the maintenance of this procedure. Approval authority rests with the Project Geophysicist and Project Quality Control Manager (PQCM).

Developed by:

  
\_\_\_\_\_  
Alan Crandall  
Project Geophysicist

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:

  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

Validated by:

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:11:04 -04'00'

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Date

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

[illegible]



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## **7. PROCEDURES**

### **7.1 TRANSFER OF FIELD DATA AND DATA TRACKING**

Several files are generated by the geophysical and RTK DGPS systems for each site surveyed. These data are stored on the data logger(s) and field computers during data acquisition activities. At the end of the day, the data collected by each field team will be turned over to the Site Geophysicist. These files are uploaded to the data management computer via PCMCIA (or equivalent) media. The following file types are generated for each survey:

- Geophysical data file with signal intensity and position (relative or absolute) measurements
- Digital photo files (\*.jpg).

Data files may also be downloaded each day from the RTK DGPS base station (if deemed necessary). The following file type is generated:

- DGPS raw data containing code and carrier phase data, position data, and site identification.

If RTK mode is used, the EM61-MK2 and corrected position data are co-located in a single computer file. The GPS data for the receiver and base may be recorded, and post-processed, as necessary, to fill in position data at times where the GPS radio modems are not functioning.

The EM61-MK2 and DGPS data may be processed either on-site or at an off-site processing center. The following information will be tracked on the Excel spreadsheet or MS Access database:

- Initials of processor
- Merged data file name

If the data has been interpreted off-site, the selected DGM target locations will be sent from the processing center back to the field. The DGM target locations will be added to the project database. The following information will be added to the Excel spreadsheet or MS Access database:

- Date DGM target file received
- Number of anomalies
- Date DGM target data added to project database.

### **7.2 DATA PROCESSING, ANALYSIS, AND INTERPRETATION**

Data will be interpreted using a combination of Geonics Dat61mk2.exe or Trackmaker for Man-portable data collection, MagmapNT for towed array data collection and Geosoft Oasis Montaj (or equivalent) software to provide coordinate location information for each target (see Attachment 1, Checklist for Data Processing).

The primary interpreter of the data will be a qualified geophysicist. As a quality control measure, the project QC Geophysicist will review the data interpreted by the primary interpreter. The QC Geophysicist also checks all BSI detections for location accuracy and response peak (see Final GSV Report).

Oasis Montaj will be used to generate color-coded images of the EM61-MK2 data for each survey grid or collection of grids (a grid block). Potential target locations will be selected using a combination of two target selection methods; automatic and manual. The automatic method utilizes the target selection algorithm within the Geosoft Oasis Montaj software (e. g., gridpeak.gx). This procedure selects anomaly locations based solely on the signal intensity. The second method (herein referred to as "manual") utilizes a data interpreter who manually selects potential target locations using data characteristics such

as the signal intensity from the coil and different time gates, anomaly footprint, anomaly shape and trend, track line characteristics (i.e., spatial sample density), terrain, previous intrusive information, the IVS results, and comments entered by the data acquisition crew regarding geology, terrain, weather, etc. The automatic target selector will select a pipeline, known cultural feature, or terrain-induced “noise” while the manual selection procedure generally will not. However, the automatic target selector prevents the interpreter from potentially “missing” an anomaly; i.e., it provides immediate feedback to the interpreter in the form of a quality control check. The automatic target selector amplitude will be set to the approved target selection threshold for the MRS.

Based on previous work at Site 12, at the size range of the items of interest for the project include discarded military munitions (DMM) M-18 smoke grenades, 40mm projectiles, 20mm projectiles, and flares. The interpreter will not attempt to differentiate MEC items from non-MEC items. If the interpreter selects any anomalies that may have a high probability of being an artifact of the data acquisition and/or data processing sequence, they will enter a comment in the interpretation file (e.g., noise due to coil bump). The interpreter will also comment if they expect multiple sources within 2.5-ft (0.762-m) of a selected anomaly.

A master Oasis Montaj grid map that contains all of the individual data acquisition files for the site will be generated and updated each day in order to track the daily progress of the geophysical survey.

The Site Geophysicist will receive and track the data from the field, load the data onto the data management computer, and transfer it to the data processing center. The geophysical data will require computer reduction prior to interpretation. The basic processes for reducing digitally recorded geophysical data include:

- Geonics or Geometrics software may be used to convert the raw EM61-MK2 data to ASCII with units of mV and a corresponding time stamp for each record.
- Assessing daily DGM checks and QC tests meet the measurement performance criteria listed in the MEC QAPP worksheet 12.
  -
- DGM data quality demonstrates:
  - Proper time gate response (e.g. Gate 1>gate 2>gate 3>gate 4) over anomaly peaks
  - Sensor drift is acceptable (e.g. Battery voltage observed in the field remains =>12.0 volts or as determined acceptable at the IVS and drift does not exceed the ability of the leveling filter to correct)

Merging of DGPS and geophysical data, if necessary (X, Y, Z file where X and Y are the corrected positions and Z1, Z2, Z3, Z4 are the instrument readings).

The Site Geophysicist or Data Processor will then process and analyze the data to create a target list and target map. All data processing steps will be documented, including; gridding parameters, all filtering parameters (e.g. drift correction), all data corrections (e.g. latency correction), and anomaly selection thresholds and procedures. Each target list will include the Grid ID, Target ID, target Easting and Northing coordinates, the electromagnetic response of the anomaly for all four time gate channels, and any analysis comments. The target data and target maps will then be given to the QC Geophysicist, who will evaluate the DGM data and anomaly selections. Any additional QC targets, identified by the QC Geophysicist, will be discussed with the Site Geophysicist or Data Processor who will add them to the target list and load them into the project database. This QC process may also result in removing selected anomalies that fail to meet the established anomaly selection criteria. The intent is to ensure all anomalies are reviewed and investigated. The QC Geophysicist will also review the DGM results for the detection and amplitude of Blind Seed Items (BSIs). Continued daily data processing and analysis includes the following:

- Data import into processing and analysis software
- Second review of all instrument checks (e.g. RTK DGPS and IVS) – Flag any/all abnormal sensor or positioning data for possible resurvey (e.g. excessive noise, drift, position jumps or gaps). Provide gap location(s) and direct the DGM team to resurvey
- Assess and apply any corrections for latency, lag, from daily IVS test – log corrections
- Drift correct survey data as required – log drift correction variables
- Grid and map corrected data – log all gridding parameters
- Select anomalies on grid data – log anomaly selection methodology
- Parse final processed DGM data and Target databases by grid
- Review all anomaly selections and add any anomalies not automatically selected. Provide comments on anomalies that do not appear to be MEC-like (e.g. potential utilities). Combine anomaly selections with the QC Geophysicist, and the Independent Government QA Contractor results
- Archive all raw, processed data, and final data and data processing documentation
- Post raw, processed, final data, and data processing documentation to the project sharepoint/ftp site within 48 hours of completing the geophysical survey. The Site Geophysicist will deliver the Dig List in comma delimited (\*.csv) or Microsoft Excel (\*.xls) format to the Project Geophysicist
- The Project Geophysicist reviews the daily data delivery packages, after the QC Geophysicist's review, and notifies the government QA contractor that each data package (by grid or grid block) is complete and delivered (see Attachment 2 for Grid Data Deliverable Checklist)

The raw (sensor and position data files), processed (positioned, corrected, grid data), and interpreted geophysical data (target dig lists and target maps) will be stored on compact disk (CD) and/or other archive electronic media. Reference information that will be recorded and stored for each survey area includes:

- Site identification (file name and data survey coordinates)
- Acquisition team identification and personnel
- Geophysical equipment used and survey date

This information will be entered from field notes or digital data files acquired by DGM personnel.

The specific parameters used to process the EM61 and GPS data may vary; however, the processing parameters and results are documented in digital computer files so that the sequence of events can be reconstructed and analyzed at a later date, if necessary. This level of documentation assists in ensuring that the overall process is repeatable.

### **7.2.1 Dig Sheet Development**

The interpreted data are digitally recorded in a \*.gdb file, and uploaded to a Microsoft Access database and/or Microsoft Excel spreadsheet. The dig sheet data for each survey grid will be organized by a unique identifier that includes the grid ID and a unique DGM target identifier for each target selection, its x-y coordinate location, signal intensity value(s) from the EM61-MK2 for all 4 time gates. Other pertinent information, such as relative anomaly size may be included, as necessary, depending upon the results of the IVS. A comment will be added for grid corners, but grid corners will not be included on intrusive dig sheets.

### **7.2.2 Interpretation Summary**

The objective of the interpretation is to select all of the legitimate targets caused by buried metallic items while minimizing the false alarm rate. For this project, the targets for the site are primarily selected based on the anomaly intensity for the different EM61-MK2 data channels, and information derived from previously-excavated targets, as provided in the MEC RI Work Plan (UFP-QAPP). The interpreter will utilize information acquired from the IVS to supplement target selection.

During intrusive investigation, the QC Geophysicist, or their designee, will review 100% of the intrusive results (e.g., target depth, length, weight, and type) and compare with the DGM characteristics. Any intrusive results that do not compare with the DGM characteristics are reported to the UXOQCS for follow-up investigation by the field QC team. A certain percentage of selected DGM targets may turn out to be “no finds” investigated DGM targets for which no response on the metal detector above background within 2.5-ft (0.762-m) are found at the interpreted location, and verified by the field QC team. If the “no find” target is determined to be an artifact of the data acquisition, processing, or interpretation processes, the specifics of the analysis will be noted in the project database so the interpreters can utilize this information during subsequent interpretation efforts.

### **7.3 DATA VALIDATION**

The following procedures applied during the processing phase of the project are performed each day to ensure the integrity of the data. Note: Any failures to meet DGM performance metrics are reported to the Project Geophysicist immediately. If the failure is confirmed, the Government QA Contractor, UXOQCS, and Site Geophysicist are notified. Data that is not of sufficient quality and quantity to meet the project objectives is documented and re-collected, if necessary. Procedural checks during the processing of the data include the following:

- Evaluation of the data collected over the IVS. These data allow the processor to qualitatively and quantitatively monitor the noise level and repeatability of the data over a “standard” item (e.g. small ISO), as well as ensure the data have been positioned correctly using the time-stamp information (i.e., the data contain no time or position shift-also known as “lag”)
- Visual examination of the repeatability and of the track path (data are mathematically interpolated so that potential “gaps” present in the data show up as a white color in the color-coded images)
- 
- Sample density, velocity, and coverage meet the measurement performance criteria listed in worksheet 12 of the MEC QAPP.

The guidelines above are for geophysical data where the “background” is a prevalent data characteristic. In areas of high anomaly density (i.e., “cluttered” areas), the above guidelines may not apply.

The data validation measures applied during the interpretation of the data are the following:

- Targets selected interactively by the user are compared to those selected automatically by Oasis Montaj. This process ensures that anomalies that meet a certain criteria for selection are not “missed” by the interpreter and thus included on the dig sheet.
- 
- Comparison of the position and EM61-MK2 data to the site features map (e.g., above-ground cultural features) are documented - should be evident by variance in track path
- Interpreted data characteristics are compared to the known responses acquired during the initial test program (e.g., IVS).

Refer to the Geophysical Systems Verification Plan in Worksheet 17 of the MEC QAPP for additional discussion regarding performance metrics and the geophysical data quality objectives.

## **7.4 GEOPHYSICAL DATA ARCHIVING AND DELIVERY**

### **7.4.1 DGM Data Archiving**

All geophysical and RTK DGPS data on the field data management computer and data processing center will be archived daily. The entire database and all associate data files will be copied to a writable CD or equivalent digital media. Maintenance of the backup data will be verified by the Site QC staff according to the schedule specified in the MEC QAPP.

### **7.4.2 DGM DATA DELIVERABLES**

#### **7.4.2.1 Raw Data for Processing Center**

All raw data to include log books and daily forms uploaded to the project ftp site within 1 work day of data collection. Data submittals arranged by date and team. Files and forms include:

- Raw data files (\*.R61, \*.M61, \*.N61, or \*.Survey)
- Scanned DGM Log Books (\*.pdf)
- Scanned DGM Survey Area Forms (\*.pdf)
- Scanned Obstacle Avoidance checklist (\*.pdf)
- Survey area pictures (\*.jpg)
- Field RTK DGPS Tracking form (\*.xlsx)
- Field IVS Tracking form (\*.xlsx)
- Field Editing form (\*.xlsx)
- Data Storage and Transfer form (\*.xlsx)

#### **7.4.2.2 Processed Data for QC**

All processed data uploaded to the project ftp site within 2 work days from raw data submittal for USA QC geophysicist and Project Geophysicist assessment. Data submittals arranged by grid and date, and include:

- DGM survey database files (\*.gdb and \*.xyz)
- DGM survey database QC files (\*.map and \*.pdf)
- DGM target database files (\*.gdb, \*.xyz, and \*.csv)
- DGM target map files (\*.grd, \*.map, \*.pdf, \*.tif)
- Data Tracking and Processing form (\*.xls)
- All associated raw files and forms

#### **7.4.2.3 Final Processed Data for QA**

All final data package submittals uploaded to the project ftp site within 2 work days from processed data submittal. Data submittals arranged by grid and date, and include:

- Final DGM survey database files (\*.gdb and \*.xyz)
- Final DGM survey database QC files (\*.map and \*.pdf)

- Final DGM target database files (\*.gdb, \*.xyz, and \*.csv)
- Final DGM target map files (\*.grd, \*.map, \*.pdf, \*.tif)
- Final Data Tracking and Processing form (\*.xls)
- All associated raw files and forms

## 7.5 QUALITY CONTROL

The digital geophysical data processing and interpretation tasks will meet the measurement performance criteria listed in worksheet 12 of the MEC QAPP.

The UXO Quality Control Specialist (UXOQCS) verifies the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any data the UXOQCS determines to not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXOQCS will prepare a Deficiency Notice or Nonconformance Report and submit to the SUXOS and Quality Assurance (QA). The Geophysical subcontractor will conduct a root cause analysis of the deficiency or nonconformance, prepare and submit a response to the Navy Technical Representative within 48 hours. If the DGM data deliverables for a grid are acceptable, the QC Geophysicist and UXOQCS sign the Data Delivery form (attachment 2) and forward to QA.

## 8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the digital geophysical data processing and interpretation task along with methods to mitigate the hazards.

**Table 1: Hazard Analysis Matrix**

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
DGM Data Processing and Analysis	Office Slips, Trips or Falls	Walking, climbing stairs; obstructed view	C/III/4	Personnel will assess their surroundings prior to proceeding with activities. Ensure footing at all times.	D/IV/5

### 8.1 HAZARD CONTROL BRIEF

Personnel will be cognizant of the surroundings at all times and remain observant of their footing in the work space.

## 9. DIAGRAMS

Site maps of the site are located in Appendix I of the MEC QAPP. Teams will be provided maps of the overall project site and evacuation routes.

## 10. EQUIPMENT

The personnel tasked with processing and interpreting the digital geophysical data will use computers, specialized software and use the internet to transmit the data to the project team.

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Safety equipment required during data processing includes the following:

- First-aid kit
- Level D Personal Protection Equipment
- Inclement weather gear as needed

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SSHP, Section 10.2 will be followed. A copy of the SSHP is maintained in all project site vehicles and in the project office.

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**ATTACHMENT 1.**  
**CHECKLIST FOR DATA PROCESSING**

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## Data Processing Checklist

Location:	<input type="text"/>	Raw File:	<input type="text"/>
Contractor:	<input type="text"/>	Processed File:	<input type="text"/>
AOC:	<input type="text"/>	Map ID:	<input type="text"/>
Grid_ID:	<input type="text"/>	Target File:	<input type="text"/>
Processor(s):	<input type="text"/>	Target Map:	<input type="text"/>
Team (s):	<input type="text"/>	Data Collection Date (s):	<input type="text"/>

### Preprocessing

1. Coordinate Conversion:	<input type="text"/>
Projected Coordinate System	<input type="text"/>
2. Removal of Drift and Leveling	<input type="text"/>
Drift Correction Parameters:	<input type="text"/>
3. Latency	<input type="text"/>
Latency Correction Value:	<input type="text"/>

### Processing

4. Initial Gridding	<input type="text"/>
Gridding Parameters:	<input type="text"/>
5. Digital Filtering and Enhancement	<input type="text"/>
6. Threshold Selection Value:	<input type="text"/>
Anomaly Selection Parameters:	<input type="text"/>
7. DGM Targets Selected	<input type="text"/>
Number of Targets	<input type="text"/>

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**ATTACHMENT 2.**  
**GRID DATA DELIVERY CHECKLIST**

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GRID \_\_\_\_\_ GEOPHYSICAL DATA (DGM) SUBMITTAL

Date: \_\_\_\_\_

Site 12 EOD Former Naval Air Station, Brunswick, Maine

CONTRACT NO. N62470-11-D-8007 CTO WE01

Team Name	
Survey Grid	
Survey Date(s)	
Target Picking Threshold	_____ mV Leveled Time Gate 1

I certify that the above DGM collection team and this grid have been processed and QC'ed according to the project plans, standard operating procedures (SOPs) and data quality objectives (DQOs). 100% of the DGM data (including IVS data, raw and processed production data, including maps and target lists, and QC information (see SOP 03 section 7.4.3)) deliverables were reviewed by the QC Geophysicist and have been posted to Sharepoint. All QC tests pass except as noted below.

QC Tests	Pass	Fail
AM and PM IVS Tests		
Footprint Coverage		
Velocity		
Sample Separation		
Seed Items Identification, Amplitude and Positional Accuracy		
Other (Identify):		

Explanation of failures or discrepancies:

Provided by: QC Geophysicist \_\_\_\_\_

Phone Number: \_\_\_\_\_

Email: \_\_\_\_\_

UXOQCS \_\_\_\_\_

Phone Number: \_\_\_\_\_

Email: \_\_\_\_\_



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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**INTRUSIVE OPERATIONS**

**SOP 6**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 6  
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## 2. REFERENCES

- DOD (Department of Defense). 2003. Methodologies for Calculating Primary Fragment Characteristics. DDESB TP 16, Revision 1. December 1.
- Navy. 1990. Protection of Personnel and Property. EOD Bulletin 60A 1-1-4, Protection of Personal Property.
- Navy. 2007. Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping. NAVSEA OP 5, Volume 1. Seventh Revision. Commander, Naval Sea Systems Command. Washington, D.C. July 1.
- Army, latest edition, TM 9-1300-200, Ammunition General
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### **3. ACRONYMS AND ABBREVIATIONS**

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
DU	Decision Unit
EM	Engineer Manual
EPP	Environmental Protection Plan
ESQD	Explosives Safety Quantity Distance
HE	high explosive
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
MPPEH	Material Potentially Presenting an Explosive Hazard
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	personal protective equipment
QAPP	Quality Assurance Project Plan
SOP	Standard Operating Procedure
SHSP	Site Health and Safety Plan
TL	Team Leader
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WP	Work Plan

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ATTACHMENT 1. CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG

ATTACHMENT 2. MEC DAILY ACTIVITIES CHECKLIST

ATTACHMENT 3. MEC EQUIPMENT CHECKLIST

ATTACHMENT 4. PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST and QC SURVEILLANCE



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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct anomaly intrusive investigation activities for material potentially presenting an explosive hazard (MPPEH) during the operations at Former Naval Air Station (NAS) Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the work area and will be used to direct intrusive operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:

  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:11:46 -04'00'

\_\_\_\_\_  
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## 5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the clearance described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Brian Thompson  
Senior UXO Supervisor

Date

## 6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

[illegible]

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DESCRIPTION: INTRUSIVE OPERATIONS  
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**7. PURPOSE**

The purpose of this SOP is to provide procedural guidance for intrusive investigative clearance of selected DGM target anomalies during the intrusive investigation at the site. These procedures will be conducted in accordance with the Work Plan, the Site Health and Safety Plan (SHSP), and Explosives Safety Submission (ESS).

**8. SCOPE**

This SOP provides guidelines for the intrusive investigation, and documentation of DGM subsurface anomalies that have been selected for intrusive investigation. Intrusive investigation of anomalies using analog and dig procedures is addressed in SOP 11. Specific requirements and definitions for personnel, training, and equipment/material, are found in the Work Plan (WP), Environmental Protection Plan (EPP) and the MEC Quality Assurance Project Plan (QAPP).

**9. DAILY PLANNING**

**9.1 DAILY BRIEFING**

At the beginning of each work day, the SUXOS or his/her designee will hold a daily briefing in accordance with the requirements of the approved Work Plan. At a minimum, this briefing will include the following:

- Work assignments
- Site Specific Explosive Safety Quantity Distance (ESQD)
- Team separation distances
- Entry and control points
- Review of emergency procedures
- Review of ordnance safety
- Review of communications procedures and equipment
- Review of any site-specific hazards and the measures that will be used to mitigate those hazards
- Review of environmental concerns
- Procedures for coordination of intrusive investigation work with personnel performing non-MEC activities.

Other issues will be discussed during the briefing as necessary to support safe and efficient operations. The SUXOS will document the daily briefing in his/her logbook and will obtain the signatures of those attending the briefing on a daily briefing attendance sheet. During the daily briefing, the SUXOS will also assign work sites to each of the UXO teams for intrusive operations. Each UXO Team Leader (TL) UXO Technician III will receive a map and any other data necessary to perform the assigned work. The SUXOS will complete the top portion of the MEC Daily Activities Checklist (Attachment 2) and give it to the TL. The top portion of this checklist verifies that the TL has received the necessary information to support the daily activities, information on utilities that may be present in the work area and daily briefing and safety information. The TLs will brief their team on potential hazards in the area where they will be working and will document the briefing on the MEC Daily Activities Checklist, as well as on the Tailgate Safety Briefing Form in the Accident Prevention Plan (APP). Work assignments, equipment inspections, and other routine daily activities will be documented on the MEC Daily Activities Checklist as well.

39 **9.2 TAILGATE SAFETY MEETING**

40 After arriving at the worksite, the TLs will conduct tailgate safety briefings to cover work assignments,  
41 procedures, and hazards specific to that site. The daily briefing may serve as the tailgate briefing if the  
42 content covers those additional issues normally reserved for discussion during the tailgate briefing. If the  
43 daily briefing is combined with the tailgate meeting, it will include:

- 44 • Review of site task assignments for the day
- 45 • Review of instrument function test procedures/requirements
- 46 • Review of task-specific hazards for that site
- 47 • Review of environmental considerations
- 48 • Review of any other task- or location-specific information needed to safely complete the assigned
- 49 daily work

50 **10. EQUIPMENT/MATERIAL REQUIREMENTS**

51 Each TL will inspect the equipment to be used prior to commencing operations each day, to ensure that  
52 proper tools and equipment are available. Required field equipment is listed in Attachment 3.

53 Proper function of all detection instruments (EM61-MK2 and hand-held instruments) and their operators  
54 will be verified at the Instrument Verification Strip (IVS) at the beginning of each day and again at the mid-  
55 day break.

56 **11. INTRUSIVE INVESTIGATION**

57 Work area subsurface investigation of anomalies are limited to investigation of selected and reacquired  
58 Digital Geophysical Mapping (DGM) anomalies. Anomalies are to be investigated to the depth of  
59 detection, but not to exceed the depth to bedrock. UXO technicians will use the EM61-MK2 to refine the  
60 location of each anomaly, based on the peak mV response within the flagged area. Hand-held analog  
61 equipment is used to detect anomalies as necessary while digging the anomaly. The EM61 will be used  
62 to confirm that the anomaly source has been cleared. Anomaly data will be recorded on ruggedized  
63 Personal Digital Assistants (PDA), using pull-down menus or on the Clearance Data and Munitions  
64 Accountability Log (Attachment 1). The following sub-paragraphs describe the equipment and  
65 procedures the individual MEC Teams will use to search the individual grids, and to remove MEC and  
66 subsurface anomalies.

67 **11.1 PERSONNEL REQUIREMENTS**

- 68 1. Each intrusive investigation team will be composed of a TL and any combination of UXOTII/I for a  
69 total of four to 6 personnel per team.
- 70 2. Intrusive investigation activities will not be conducted until the required training (both general and site-  
71 specific), and proper equipment/vehicle checks, have been completed.
- 72 3. Intrusive investigation operations will not be initiated until an appropriate Exclusion Zone (EZ) is  
73 established based on the munitions with the greatest fragment distance (MGFD), and in accordance  
74 with the approved Explosives Safety Submission (ESS).

75 The SUXOS will be notified of all MEC finds. The following sections discuss various elements of the  
76 intrusive process.

## 77 11.2 ANOMALY EXCAVATION PROCEDURES

78 The Target Reacquisition team will reacquire and mark anomalies to be excavated in accordance with  
79 SOP 12, Target Reacquisition. The TLs will be provided with dig packages containing the coordinates of  
80 the targeted geophysical anomalies to be investigated that day.

81 The intrusive team will use the EM61 to refine the location of the anomaly by moving the instrument over  
82 the target area and monitoring to locate the peak mV response. A hand-held metal detector will be used  
83 to locate the boundaries of the anomaly. Most of the excavations will be performed by hand, but in  
84 accessible areas, a backhoe or small tracked excavator may be used to excavate a shallow trench along-  
85 side of the targeted anomaly or to remove overburden material, to provide access and reduce the labor  
86 required for the intrusive investigation. Mechanical equipment may also be used to excavate test holes  
87 within a DGM polygon.

88 All anomalous features in a 1.5-ft radius around the refined flag location will be investigated and removed.  
89 Anomalies will be pursued to depth of detection or to bedrock. If an anomaly is greater than 4 ft bgs., the  
90 UXOSO is to be notified and proper safety procedures reviewed before proceeding to depth using  
91 applicable trench safety measures (i.e. benching of the excavation to prevent cave-ins).

92 If nothing is found at a flagged location, the PDA or Comment section of the Clearance Data & Munitions  
93 Accountability Log will be annotated as a "No find" for the anomaly.

94 The specific intrusive investigation procedures are outlined below:

- 95 • An appropriate EZ will be set up for intrusive operations.
- 96 • Each anomaly will be investigated by estimating the boundaries using the hand-held detector and  
97 excavating gently to one side of the target. A shovel may be used to excavate overburden  
98 material. As the excavation approaches the suspected location of the anomaly smaller hand  
99 tools and/or a gloved hand will be used to expose the item.
- 100 • Munitions debris will be collected at designated locations within the work area for transportation to  
101 a storage area, pending shipment off-island for demilitarization.
- 102 • If the anomaly is determined to be MEC, the item will be marked and the SUXOS will be notified  
103 to determine disposition of the item.
- 104 • If the item is determined by the SUXOS to be MEC and unacceptable to move, it will be left in  
105 place and barricaded until it can be safely detonated at the end of the workweek. Notifications to  
106 the Project Manager will be made as outlined in the WP.
- 107 • If MEC is not intact upon discovery, i.e. exposed high explosive (HE) or filler, this will be noted on  
108 the Remedial Investigation Data Sheet. If the munitions item is judged to be safe to transport, it  
109 will be placed in the temporary MEC storage magazine. Any HE or filler that is found on the soil  
110 will be marked with a Differential Global Positioning System (DGPS) coordinate or measured from  
111 a grid corner and logged in the TL's logbook.
- 112 • If an anomaly is located that is not munitions related and it is too large to be removed, it should  
113 be left in place. The target will be noted as an abandoned dig on the Clearance Data and  
114 Munitions Accountability Log. An explanation of the situation will also be provided in the  
115 Comment section.
- 116 • Once an anomaly is removed, the TL will inspect the excavation both visually and with the all-  
117 metals locator to ensure that all anomalies present within the dig depth have been removed. A  
118 final pass with the EM61 will be conducted and the post intrusive mV response recorded.
- 119 • Upon completion of the excavation and the required Quality Control (QC) checks, the hole will be  
120 backfilled. The hole must be cleared or the reason noted on the Clearance Data and Munitions  
121 Accountability Log (e.g., numerous nails spread over a wide area, no find).



122 The TL will inform the SUXOS when intrusive activities are completed, and will complete the remaining  
123 items on the MEC Daily Activities Checklist (Attachment 2), to document successful completion of  
124 required activities. The completed checklist will be submitted to the SUXOS.

### 125 **11.3 ANOMALY REPORTING**

126 When practicable, the TL will record recovered anomaly data on ruggedized PDAs using pull-down  
127 menus or on the Clearance Data and Munitions Accountability Log. When a PDA is used, an entry will be  
128 made for each anomaly encountered by the dig team members. All fields will be completed by the TL in  
129 accordance with the pull-down menu instructions. The TL will turn over the PDA to the Data Manager at  
130 the end of the day. The Data Manager will check the data for completeness and accuracy, will download  
131 the data to the project database, and upload the PDA with the next day's data.

132 When a PDA is not used, the dig teams will record anomaly data on the Clearance Data and Munitions  
133 Accountability Log. In the field, the UXO team will complete all fields on the top portion of the form. If  
134 information is not known or a field is not applicable to an anomaly (e.g., Munitions Mark/Mod), so indicate  
135 in the field, and do not leave fields blank. The TL will check each form for completeness and will turn  
136 them over to the SUXOS daily. All Clearance Data and Munitions Accountability Logs, digital  
137 photographs, and checklists will be turned over to the SUXOS at the end of each working day without  
138 exception. It is critical that data not be compromised through loss or improper handling. The SUXOS will  
139 identify errors in the forms, have the TL correct the errors, and turn the forms over to the Data Manager  
140 for entering into the project database. The location and identifying information for recovered seed items  
141 will be recorded on the PDA or on the Clearance Data and Munitions Accountability Log as well.

142 A photograph will be taken of MEC and each piece of MPPEH recovered and will be annotated on the  
143 Clearance Data and Munitions Accountability Log to further document the item.

### 144 **11.4 DAILY SITE RESTORATION**

145 Following intrusive sampling each day, anomaly excavations are to be backfilled. If there is a reason to  
146 leave an excavation open. Stakes and caution tape or other acceptable materials may be installed  
147 around the perimeter as a precaution. If utilized, exclusion zone signs can be left in place with the  
148 approval of the SUXOS. Exclusion zone signs will be left in place if UXO remains in the work area.

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**ATTACHMENT 1.**

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**CLEARANCE DATA & MUNITIONS ACCOUNTABILITY LOG**

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		<b>CLEARANCE DATA &amp; MUNITIONS ACCOUNTABILITY LOG</b>		
<b>FOR UXO TEAM USE</b>				
Site Name:		Team Leader:		
Grid or Lane Number:	Work Area:		Date:	
Location: X (Lat): _____		Y (Long): _____		Location Type (UW or UG): _____
Other Location Information: _____				
Depth (feet): _____		Inclination (Degrees): _____		Orientation (N-S, E-W): _____
<b>TARGET/ANOMALY CHARACTERISTICS</b>				
Type of Target/Find: <input type="checkbox"/> Surface Find <input type="checkbox"/> Mag & Dig Target <input type="checkbox"/> Primary Geo Target <input type="checkbox"/> Validation (QA/QC) <input type="checkbox"/> No Dig				
Type of Anomaly: <input type="checkbox"/> MPPEH <input type="checkbox"/> UXO <input type="checkbox"/> MEC <input type="checkbox"/> Inert <input type="checkbox"/> Practice <input type="checkbox"/> Metallic Scrap <input type="checkbox"/> No Find* <input type="checkbox"/> Rock <input type="checkbox"/> Rust Layer <input type="checkbox"/> Abandon Dig* <input type="checkbox"/> Seed Items Recovered (By location, quantity and seed number):				
<input type="checkbox"/> Misc.* *Comments:				
Diameter/Width:		Length:		Estimated Weight:
<b>DIGITAL PHOTO RECORD</b>				
Was photo taken?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Camera No.:	Frame No.:	File Name:
<b>MUNITIONS NOMENCLATURE</b> (If Known, Record Below and record fuze condition and disposition)				
Munitions Mark/Mod:	Fuze Mark/Mod:			N.E.W. Total:
	<input type="checkbox"/> Nose: _____ <input type="checkbox"/> Tail: _____ <input type="checkbox"/> Transverse: _____ <input type="checkbox"/> Casing: _____			

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<b>MUNITIONS CHARACTERISTICS</b>		
Munitions Filler: <input type="checkbox"/> Explosive <input type="checkbox"/> Inert <input type="checkbox"/> Propellant <input type="checkbox"/> Pyrotechnic <input type="checkbox"/> Unknown <input type="checkbox"/> Other:		
Munitions Category: <input type="checkbox"/> Depth Charges <input type="checkbox"/> Land Mine <input type="checkbox"/> Projectiles <input type="checkbox"/> Sea Mines <input type="checkbox"/> Bombs <input type="checkbox"/> Grenades <input type="checkbox"/> Misc. Explosive Devices <input type="checkbox"/> Pyrotechnics and Flares <input type="checkbox"/> Small Arms <input type="checkbox"/> Clusters/Dispensers <input type="checkbox"/> Guided Missiles <input type="checkbox"/> Mortars <input type="checkbox"/> Rockets <input type="checkbox"/> Torpedoes		
<b>FUZE CHARACTERISTICS</b>		
Fuze Location(s) (check all that apply): <input type="checkbox"/> Nose <input type="checkbox"/> Tail <input type="checkbox"/> Transverse <input type="checkbox"/> Casing	Breaks in Fuze Body? <input type="checkbox"/> Yes <input type="checkbox"/> No	Fuze Markings:
Fuzing Type(s): <input type="checkbox"/> Hydrostatic <input type="checkbox"/> MT Long Delay <input type="checkbox"/> Powder Train Time Fuze <input type="checkbox"/> Nose MT/Tail Impact Inertia <input type="checkbox"/> All-ways Acting <input type="checkbox"/> Impact <input type="checkbox"/> MT Superquick <input type="checkbox"/> Pressure <input type="checkbox"/> Pt-initiating-Base-detonating <input type="checkbox"/> Base Detonating <input type="checkbox"/> Influence <input type="checkbox"/> Piezo-Electric <input type="checkbox"/> Proximity (VT) <input type="checkbox"/> Electric <input type="checkbox"/> Mech Time (MT) <input type="checkbox"/> Point Detonating (PD) <input type="checkbox"/> Nose MT/Tail Pressure		
Fuze Length:	Fuze Diameter:	Diameter of Fuze Well:
<b>MEC STATUS &amp; PHYSICAL CONDITION</b> (Check all that apply)		
<input type="checkbox"/> Armed <input type="checkbox"/> Unarmed <input type="checkbox"/> Fired <input type="checkbox"/> Unfired <input type="checkbox"/> Intact <input type="checkbox"/> Broken Open <input type="checkbox"/> Filler Visible <input type="checkbox"/> Soil Staining		
<b>FOR SUXOS USE</b>		
Disposition: (Clarify Under Remarks) <input type="checkbox"/> Transferred <input type="checkbox"/> Transported <input type="checkbox"/> Left In Place <input type="checkbox"/> Destroyed <input type="checkbox"/> BIP <input type="checkbox"/> Other : _____		Date:
Client Notifications By:	Signature:	Date:
Transferred To:	Signature:	Date:
Destroyed By:	Signature:	Date:
Remarks:		
SUXOS Signature:		Date:

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## **ATTACHMENT 2.**

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### **MEC DAILY ACTIVITIES CHECKLIST**


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	<b>MEC DAILY ACTIVITIES CHECKLIST</b>
<b>Project Information</b>	
Project Name: _____	Date: _____
Project Location: _____	Team No. _____
Work Area: _____	
<b>SUXOS Checklist items</b>	
Name: _____	
<i>Check Items Complete</i>	
<input type="checkbox"/>	Conduct daily briefing (safety, emergency procedures, munitions information, etc.).
<input type="checkbox"/>	Make mandatory notifications prior to conducting field operations (fire, medical support, military offices, etc.).
<input type="checkbox"/>	Notify team leader of utilities or other dangers. _____
<input type="checkbox"/>	Assign work area and provide data package.
<b>UXO Team Leader Checklist Items</b>	
Name: _____	
<i>Check Items Complete</i>	
<input type="checkbox"/>	Ensure that all necessary data have been provided by the SUXOS for daily operations.
<input type="checkbox"/>	Conduct vehicle inspection.
<input type="checkbox"/>	Conduct tailgate safety briefing.
<input type="checkbox"/>	Perform equipment inspections and operational tests (record in log book).
<input type="checkbox"/>	Verify daily heavy equipment inspection.
<input type="checkbox"/>	Identify known utilities.
<input type="checkbox"/>	Ensure that work area is secure as required (road closures, exclusion zone set up, etc.).
<input type="checkbox"/>	Notify site office of start time for ordnance operations.
<input type="checkbox"/>	Ensure that all required data have been recorded (data sheets, log books, photo log, etc.).
<input type="checkbox"/>	Ensure that site restoration required is complete.
<input type="checkbox"/>	Notify site office of stop time for ordnance operations.
<b>Approvals</b>	
SUXOS Signature: _____	Date: _____
Team Leader Signature: _____	Date: _____

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**ATTACHMENT 3.**

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**MEC EQUIPMENT CHECKLIST**


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		<h2 style="text-align: center;">MEC EQUIPMENT CHECKLIST</h2>	
<b>Basic Equipment</b> (Required for all UXO work)			
✓	<b>Quantity</b>	<b>Item Description</b>	
<input type="checkbox"/>	1	Air horn	
<input type="checkbox"/>	2 rolls	Caution tape	
<input type="checkbox"/>	1	Emergency eye wash	
<input type="checkbox"/>	1	Fire extinguisher	
<input type="checkbox"/>	1	First-Aid/trauma kit (equipped for white phosphorus burns)	
<input type="checkbox"/>	TBD	Flashlight, as needed	
<input type="checkbox"/>	1 pair	Gloves, leather (or other approved work gloves) ( per team member)	
<input type="checkbox"/>	2	Radios (2-way)	
<input type="checkbox"/>	TBD	Pin flags (non-metallic)	
<input type="checkbox"/>	1	Metal detector (Schonstedt GA 52cx)	
<input type="checkbox"/>	3	Shovel, round point	
<input type="checkbox"/>	2	Warning signs for exclusion zone	
<input type="checkbox"/>	TBD	Tape, duct, as needed	
<input type="checkbox"/>	TBD	Tape, plastic, as needed	
<input type="checkbox"/>	1	Toolbox, general hand tools	
<input type="checkbox"/>	1	Trowel	
<input type="checkbox"/>	TBD	Water bottle, 1 liter, adequate supply for team members	
<input type="checkbox"/>	--	Field log book and field forms (as appropriate)	
<input type="checkbox"/>	1	Hand cleaner	
<b>Site-Specific Items</b> (Write in items and quantity)			
✓	<b>Quantity</b>	<b>Item Description</b>	
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			
<input type="checkbox"/>			

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**ATTACHMENT 4.**

**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**

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## PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE

SITE 12 EOD AREA

N62470-11-D-8007 CTO WE01

### INTRUSIVE OPERATIONS

TEAM INFORMATION		
Team:	Location:	Date:
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	SOP-6 Workers' Statement	Have all team members reviewed SOP 6, Intrusive Operations?				(P)
2	MEC QAPP WS#7 & 8	Are all Intrusive Team Members qualified in accordance with MEC SAP WS #7 & 8?				(P), (I), (F)
3	SOP-6, Attach. 2	Has the SUXOS made all mandatory notifications prior to commencing operations?				(P), (I), (F)
4	MEC QAPP WS#17, Section 17.1	Was an EZ established by the SUXOS prior to beginning the intrusive investigation?				(P), (I), (F)
5	MEC QAPP WS#17, Sec. 17.1	Are Team Separation Distances maintained?				(P), (I), (F)
6	SOP-6, Attach. 3	Is all required equipment, in accordance with the listed reference, on hand and operational?				(P), (I), (F)
7	APP, SHSP	Are all team members properly outfitted with the appropriate PPE?				(P), (I), (F)
8	APP	Have all personnel read and signed all AHAs associated with the intrusive operations?				(P), (I), (F)



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CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
9	SHSP	Have on-site and off-site communications channels been established prior to clearance activities commencing?				(P), (I), (F)
10	APP	Has the Team Leader conducted the Tail Gate Safety Briefing before beginning the intrusive investigation?				(P), (I), (F)
12	MEC QAPP WS#17, Sec. 17.7	Has each grid been divided into individual 5-ft search lanes?				(P), (I), (F)
13	MEC QAPP WS#17, Sec. 17.7	Are MEC team members swinging the analog detector back and forth to maintain the instrument tip within 6 inches of the ground and complete coverage of the lane?				(P), (I), (F)
14	MEC QAPP WS#17, Sec. 17.7	Are anomalies investigated to the required depths?				(P), (I), (F)
15	MEC QAPP WS#17, Sec. 17.7	Is all subsurface anomalous features removed from the hole prior to moving forward?				(P), (I), (F)
16	SOP-8	Are all recovered materials properly inspected, further classified and segregated in accordance with the listed reference?				(P), (I), (F)
17	MEC QAPP WS#17, Sec. 17.6	Are MEC items properly identified, marked and their location recorded for future disposal?				(P), (I), (F)
18	SOP-6, Attach. 1	Is the Team Leader completing all entries on the PDA or his portion of the Clearance Data and Munitions Accountability Log?				(P), (I), (F)
19	SHSP	Are personal hygiene and decontamination procedures followed?				(P), (I), (F)
20	EPP	Are Best Management Practices and good housekeeping procedures followed, to mitigate impacts to the project site?				(P), (I), (F)

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FINDINGS	
Item	Comments

200

201

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**EXCAVATOR OPERATIONS**

**SOP 7**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

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## 2. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, consultation of other SOPs and regulatory references may be needed:

- OSHA Construction Industry Standard 29 CFR, Part 1926, Subpart P, Applicable Sections
- USACE Engineer Manual (EM) 385-1-1, Section 25
- USA Corporate Safety and Health Program
- Manufacturer's Operating Manuals

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### **3. ACRONYMS AND ABBREVIATIONS**

APP	Accident Prevention Plan
DGM	Digital Geophysical Mapping
ESS	Explosives Safety Submission
QAPP	Quality Assurance Project Plan
SHSP	Site Health and Safety Plan
SOP	Standard Operating Procedure

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ATTACHMENT 1: EXCAVATOR/BACKHOE OPERATING PROCEDURES

ATTACHMENT 2: EXCAVATOR/BACKHOE SAFETY CHECKLIST

PROCEDURE No.: SOP 7  
DESCRIPTION: EXCAVATOR OPERATIONS  
REVISION No.: FINAL  
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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct intrusive investigations, using an excavator, for material potentially presenting an explosive hazard (MPPEH) during the MEC activities at Former Naval Air Station (NAS) Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the project area and will be used for intrusive operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:


  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
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Date: 2013.09.25 17:12:07 -04'00'

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

PROCEDURE No.: SOP 7  
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## **7. PROCEDURES**

The purpose of this standard operating procedure (SOP) is to provide procedural guidance for use of a backhoe or a tracked excavator to assist or augment manual excavation of selected target anomalies, whether DGM targets or for analog and dig anomalies. It also provides guidelines for the use of excavation equipment to excavate exploratory test holes (test pitting/trenching) as may be necessary for intrusive investigation of large area response DGM anomalies (polygons) if hand excavation becomes impractical. These procedures will be conducted in accordance with the Quality Assurance Project Plan (QAPP), the Accident Prevention Plan (APP), the Site Health and Safety Plan (SHSP), Explosives Safety Submission (ESS), and the manufacturer's operations manuals will be used for all heavy equipment operations onsite.

All personnel involved in excavation operations shall be familiar with the potential safety and health hazards associated with the conduct of this operation, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

### **7.1 SAFETY HAZARDS AND OPERATIONAL CONTROL TECHNIQUES**

The safety and health hazards and operational control techniques to be used during conduct of excavation operations are discussed below:

- Prior to initiation of any excavation activity, the location of underground utilities and installations shall be determined.
- Removal of overburden material involves excavating beside the anomaly location, using handheld metal detectors to verify the depth of the anomaly, and then removing material above the anomaly in order to avoid direct contact of the anomaly with the excavator bucket. A minimum of 12 in is to be maintained between the suspected anomaly and excavator bucket.
- Evidence of cave-ins, slides, sloughing, fissures, water seepage, bulging, undercutting, tension cracks, or similar conditions will be cause for work to cease until necessary precautions are taken to safeguard workers.
- Spoils and other materials shall be placed a least 2 ft from the edge of the excavation.
- The excavation shall be inspected by the competent person in excavation and trenching (the UXOSO), to determine if it meets the criteria for a confined space.
- If an excavation is determined to be a confined space, the requirements set forth in the Confined Space Program SOP, Corporate Safety and Health Program shall apply, as well as the requirements of 29 CFR 1910.146 and EM 385-1-1. However, it is the intent of this project that exploratory test holes will be less than 4 ft deep, and if they are deeper or where slope stability is questionable, personnel shall not enter the excavation.
- All excavations shall be properly barricaded or flagged off, to prevent personnel from accidentally falling into the excavation or trench.
- Spoils shall be returned to the excavated hole once the anomalous feature has been removed.

### **7.2 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS**

Personnel shall wear the appropriate level of protection, as specified in the Site Safety and Health Plan. The personal protection equipment (PPE) outlined in the Site Safety and Health Plan will have been selected in accordance with the chemical and physical hazards anticipated for the given task, and will comply with the PPE section of the APP. Additionally, no site personnel shall enter an excavation site until it has been inspected by the excavation and trenching competent person, and all safety- and health-related precautions and controls have been implemented.



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**ATTACHMENT 1.**  
**EXCAVATOR/BACKHOE OPERATING PROCEDURES**

PROCEDURE No.: SOP 7  
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## **EXCAVATOR/BACKHOE OPERATING PROCEDURES**



### **BEFORE USING THE MACHINE**

- Read the owner's manual to learn the characteristics of your machine.
- For your personal protection you will need to wear some or all of the following:
  - sturdy pants and shirt
  - safety shoes
  - hard hat
  - safety goggles or glasses
  - gloves
  - hearing protection
  - respirator for dusty conditions
- Sunscreen protection is vital in bright sunshine if not under a roof.
- Check the excavator/backhoe for the presence of the following safety devices in good working order:
  - rollover protective structure (ROPS)
  - seat belt (if ROPS equipped)
  - guards
  - shields
  - backup warning system
  - lights, and mirrors
- Fill the fuel tank while engine is off and cool. Never fill inside a building. Do not smoke. Wipe up any spills immediately.
- Check the machine daily for broken, missing, or damaged parts. Make the necessary repairs or replacements.
- Keep the machine clean -- especially steps, hand rails, pedals, grab irons, and floor of the cab. Slippery surfaces are very hazardous.
- Remove or secure loose items in the cab that could interfere with operating the controls.
- Check the work area for hidden holes, obstacles, drop-offs, etc. Clear children, pets, and bystanders from the area.
- Check overhead for utility lines, roofs, and other obstacles.
- Request Blue Stake service to locate underground cables, gas lines, water, and sewer lines before digging. You need to request this service in advance.

- Always use the hand rails, ladders, and steps provided when mounting the machine; never grab controls or the steering wheel.
- The cab was designed for one person -- allow no riders, especially children.

#### **OPERATING THE EXCAVATOR/BACKHOE**

- Keep the loader bucket on the ground.
- Level the machine for maximum stability.
- Operate the backhoe only from the seat.
- Never swing the bucket over a truck cab.
- Dump the bucket uphill if possible when operating on a slope. If you must dump downhill swing slowly to avoid tipping the machine.
- Be sure the load you are lifting is balanced, and move the boom slowly to avoid swaying the load.

#### **SAFE STOPPING PROCEDURE**

- Park the machine on level ground if possible and set the parking brake. Place transmission in park if so equipped.
- Lower the loader and backhoe buckets to the ground.
- Stop the engine and remove the key.
- Work the hydraulic controls to relieve pressure.
- Wait until all motion has stopped and then dismount carefully using steps and safety holds. Do not jump from the machine.

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**ATTACHMENT 2.**  
**EXCAVATOR/BACKHOE SAFETY CHECKLIST**

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### EXCAVATOR/BACKHOE SAFETY CHECKLIST

Site/Location: \_\_\_\_\_

Date: \_\_\_\_\_

#### Excavator/Backhoe Characteristics:

- ☐ Labeled for operating rated capacity.
- ☐ Steps and grab handles.
- ☐ Seat belts / ROPS.
- ☐ Protective shields or guards.
- ☐ Correct bucket size.
- ☐ Proper lighting and signals.
- ☐ Operating handles easy to reach for operator with full view of work area from all positions.
- ☐ Brake system.
- ☐ Appropriate type of fire extinguisher readily available.

#### Excavator/Backhoe Operators:

- ☐ Trained and designated to use the equipment.
- ☐ Never exceed the equipment's rated capacity.
- ☐ Use warning signal to alert others in the work area to problems.
- ☐ Allow proper clearance, including overhead.
- ☐ Select correct size of bucket.
- ☐ Ensure area to be dug has been marked. Observe the area and contact the utilities company(s) for locations of utilities. Request "blue stake" service in advance of operations.
- ☐ Tighten sling without hands or fingers between sling and load.
- ☐ Know maximum depth capability.
- ☐ Ensure stop locks or barricades are placed near the excavation.
- ☐ Balance loads placed in buckets.
- ☐ Wear correct personal protective equipment while operating backhoe.
- ☐ Remove and secure loose clothing, tools, equipment, etc., out of operating area in cab.
- ☐ Never operate boom or bucket in an unsafe manner.
- ☐ Use equipment smoothly, avoiding sudden starts and stops.

#### Bucket Characteristics:

- ☐ Select by rated capacity and job requirements for model being operated.



**Excavator/Backhoe Inspection:**

- ☐ Operators are to check, observe, correct, and ensure the following at a minimum:
- ☐ Observe warnings, cautions, precautions, and recommendations in the operator's manual.
- ☐ Operating mechanism: check all controls and throttle.
- ☐ Hydraulic system: Check hoses, lines, and connections or fittings
- ☐ Proper fluid levels: Check all fluid levels, use only approved fluid replacements.
- ☐ Hoses and lines: Check for cuts, excessive wear, or leaks.
- ☐ Air filter system: Check for cleanliness and in place.
- ☐ Frame-lock lever: Check lever and lock stop for damage.
- ☐ Lighting and mirrors: Check for serviceability.
- ☐ Frame, steps, and grab handles: Check for damage.
- ☐ Brakes: Check for stopping ability on and off road.
- ☐ Backup warning alarm: Check for serviceability.
- ☐ Seatbelts/ROPS: Check for cuts or missing/inoperable components.
- ☐ Exhaust system: Check for leaks or missing components.
- ☐ Check for fluid leaks: Check for any fluid leaks, use spill control methods until repaired.
- ☐ Tires: Check for proper inflation, tread wear and damage to rims.
- ☐ Grease fittings: Check fittings and grease every 8 hours of use ensure correct type and amount is utilized.
- ☐ Inspect work area: Check for stop blocks or barricades, collapsed walls, unauthorized personnel in area, obstacles, or other hazardous or dangerous conditions/situations.
- ☐ Conduct repair/maintenance outside of populated work area. Turn equipment off, lower buckets, display warning signs.

**Completed By:**

\_\_\_\_\_  
Name

\_\_\_\_\_  
Position

**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**MPPEH MANAGEMENT**

**SOP 8**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 8

DESCRIPTION: MPPEH MANAGEMENT

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PROCEDURE No.: SOP 8

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## **2. REFERENCES**

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Remedial Investigation Work Plan (WP)
- Accident Prevention Plan (APP)
- NAVSEA OP 5, Volume 1, Seventh Revision, Ashore
- EODB 60A-1-1 31, EOD Disposal Procedures
- 27 CFR 555, Commerce in Explosives
- FM 5-250, Explosives and Demolitions
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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### 3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
CFR	Code of Federal Regulations
DOD	Department of Defense
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
FM	Field Manual
HTRW	Hazardous, Toxic, or Radioactive Waste
MDAS	Material Documented as Safe
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAVSEA	Naval Sea Systems Command
NEW	net explosive weight
NOSSA	Naval Ordnance Safety and Security Activity
PM	Project Manager (USA)
PPE	Personnel Protection Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
RPM	Remedial Program Manager
SOP	Standard Operating Procedures
SHSP	Site Health and Safety Plan
SUXOS	Senior UXO Supervisor
TBD	To Be Determined
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
USEPA	U. S. Environmental Protection Agency
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
UXO	Unexploded Ordnance
WP	Work Plan

PROCEDURE No.: SOP 8

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ATTACHMENT 1. DD Form 1348-1A Example

ATTACHMENT 2. MATERIAL INSPECTION AND RELEASE FORM

ATTACHMENT 3. NON-HAZARDOUS WASTE (CONTAINER LABEL)

ATTACHMENT 4. PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST and QC SURVEILLANCE



PROCEDURE No.: SOP 8

DESCRIPTION: MPPEH MANAGEMENT

REVISION No.: FINAL

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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct material potentially presenting an explosive hazard (MPPEH) management during the operations at the Former Naval Air Station (NAS) Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the project area and will be used to direct MPPEH management operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:


  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:12:30 -0400

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

PROCEDURE No.: SOP 8

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PROCEDURE No.: SOP 8

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## **7. PURPOSE**

The purpose of this SOP is to provide procedures that ensure that interior and exterior of all recovered MPPEH is inspected to determine what explosive hazard, if any exist, require further treatment before shipping off-site for final treatment. These procedures are general in nature and may be refined with the concurrence of the Senior UXO Supervisor (SUXOS), to adapt to specific site conditions and circumstances.

## **8. SCOPE**

These procedures will be conducted in accordance with the Work Plan, the Site Health and Safety Plan (SHSP) and the Explosives Safety Submission (ESS). This SOP provides the MPPEH management process that describes the inspection, storage, certification/verification procedures, and the chain of custody requirements, for materials documented as safe (MDAS) slated for shipment to an authorized recycler. Specific requirements for personnel, training, equipment/material, surface search, anomaly investigation, and documentation are found in the (Munitions and Explosives of Concern) MEC Quality Assurance Project Plan (QAPP).

## **9. DOCUMENTATION OF EXPLOSIVE SAFETY STATUS**

All recovered MPPEH items will undergo a 100% inspection and an independent 100% re-inspection to determine and document whether it is safe [material documented as safe (MDAS)] or whether it is known to have or is suspected of having an explosive hazard [material documented as an explosive hazard (MDEH)]. The sequence of events in the inspection process is summarized in Figure 1.

The Project Manager (PM) must designate, in writing, to the Remedial Program Manager (RPM) those personnel that area qualified and authorized to inspect MPPEH and document its explosives safety status. The RPM will then obtain approval from the Commanding Officer or Officer in Charge of the cognizant command. The PM will designate all UXO Technician III (UXOTIII) personnel and above.

A UXOTI can tentatively identify items; however, a UXOTII or UXOTIII must confirm the identification. A UXOTII will perform a 100% inspection of each item as it is recovered and determine;

- If the item is MDAS, requiring no additional treatment prior to containerizing for off-site shipment
- If the item remains MPPEH that requires additional treatment (demilitarization, i.e. detonation or venting to expose a dangerous filler)

A second UXOTIII, SUXOS, UXOQCS or UXOSO will conduct a 100% visual re-inspection of all recovered items to determine the proper classification as MDAS, MPPEH, or an item containing other dangerous fillers or Hazardous, Toxic or Radioactive Waste (HTRW) constituents. The two inspectors of the recovered items will document the safety status of the recovered items using the procedures described in the following paragraphs.

### **9.1 MDAS**

The UXO Technicians conducting the initial and second 100% visual inspections of the MDAS will document the explosives safety status and MDAS accumulation on the Material Inspection and Release Form (Attachment 2).

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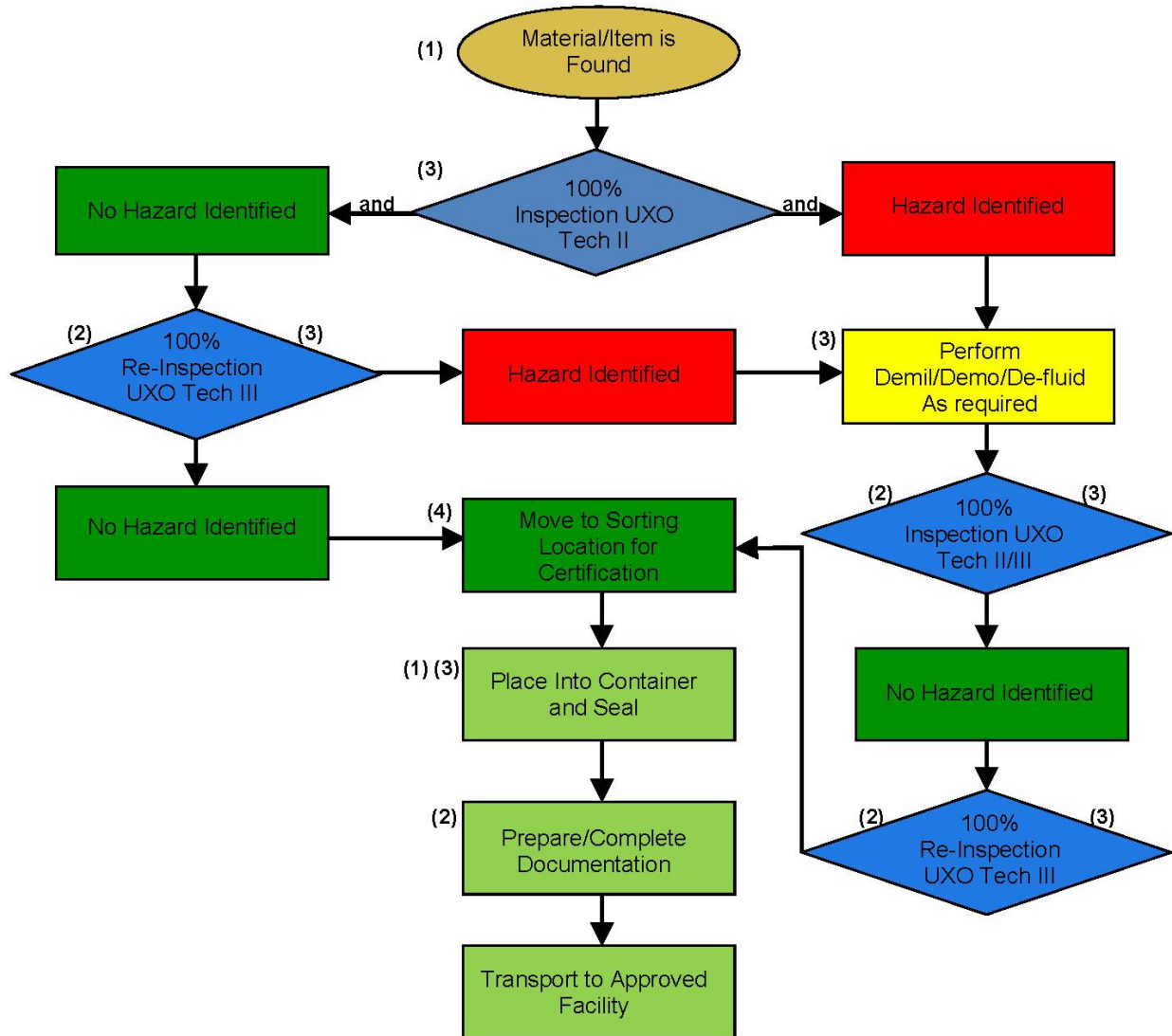
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## **9.2 MPPEH**

MPPEH is to processed documented and processed along with MEC in accordance with SOP 9.

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Figure 1: MPPEH Process



Notes:

During performance of the steps within the MPPEH Inspection Process, Notes 1 – 4 below are utilized to ensure supervision and compliance requirements are met.

(1) The UXOQCS will conduct daily audits of procedures used by UXO teams for MPPEH processing.

(2) The UXOQCS will perform random sampling of recovered material/items and documents for accuracy/completeness.

(3) The UXOSO will observe procedures to ensure compliance with the approved plans and safety measures.

(4) The SUXOS will perform random checks to satisfy that the munitions debris and range-related debris is free from explosive hazards necessary to complete DD Form 1348-1A.



## **10. DOCUMENTATION FOR TRANSPORT AND STORAGE**

Prior to on-site movement, MPPEH must be evaluated and determined to be safe to move and package with cushioning material, or hand carried to prevent movement during transportation to the temporary storage magazine or demolition consolidation location.

### **10.1 MDAS CERTIFICATION AND VERIFICATION**

The SUXOS will certify the MDAS by preparing and signing the DD Form 1348-1A for all shipments of recovered materials. The DD Form 1348-1A (Attachment 1) will contain the following statement to be signed by the SUXOS and the UXOQCS.

*"The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard".*

### **10.2 MDAS CONTAINERIZATION**

MDAS is placed in closed containers (i.e. sealable buckets or drums) that will be sequentially number and:

- Closed in such a manner that the applied seal will be broken if the container is opened
- Be clearly labeled with USA Environmental, Inc., the installation/project name, the sequence number (e.g. 0001), and the container's unique seal identification. Refer to Attachment 3 for detailed requirements for completing the label.

### **10.3 MAINTAINING THE CHAIN OF CUSTODY**

The MDAS will be shipped to a recycler under the chain-of-custody procedure. The chain-of-custody will be terminated when the material is smelted or demilitarized by the recycling facility, and documentation is returned from the facility attesting to the process.

The chain of custody must remain intact until the MDAS is released from Department of Defense (DOD) control, and is received and signed for by the qualified receiver to further manage and process the material in accordance with DOD Instruction 4140.62. The qualified receiver will:

- Receive the unopened labeled containers
- Review and concur with the supporting documents
- Sign the 1348-1A and stipulate, on company letterhead, that the contents of the sealed containers will not be sold, traded or otherwise given to another party prior to smelting, and are only identifiable by their basic contents
- Send the supporting documentation and notification to USA that the MDAS in the sealed containers has been smelted and is only identifiable by its basic content.

If the chain of custody is broken at any time during shipment, the contents of the affected container will revert to MPPEH and will require a second 100% inspection and a 100% re-inspection, will be documented as certified and verified as MDAS by qualified USA personnel.

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**ATTACHMENT 1.**

**DD FORM 1348-1A EXAMPLE**

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Adobe Designer 8.0

The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard.

**Technical Method Used:**

Approval Letter:

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

**DD Form 1348-1A: FOR USE FOR PROPERTIES WHERE ONLY MUNITIONS DEBRIS  
IS BEING PROCESSED**

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**ATTACHMENT 2.**

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**MATERIAL INSPECTION AND RELEASE FORM**

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**USA 100% MATERIAL INSPECTION AND RELEASE FORM**

Project:				Document Date:			
Location:				Document Number:			
Container Number:	Seal #:	Initials 1st:	Initials 2nd:	Reseal #:	Initials 1st:	Initials 2nd:	Comments:
The above listed containers have received two separate 100% inspections to ensure proper classification of material.							
A copy of this form is to accompany the listed containers to final disposition and be retained for a period of 3 years.							
This form is used to document the inspections performed by two UXO qualified personnel, one of whom must be a Technician III or higher.							
This form is not to be used in place of other required documents for the transportation and/or accountability of material.							
Name of First 100% Inspector:				Title:		Date:	
Name of Second 100% Re-Inspector:				Title:		Date:	



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**ATTACHMENT 3.**

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**NON-HAZARDOUS WASTE (CONTAINER LABEL)**

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**NON-HAZARDOUS WASTE**  
 Solid Waste Excluded From Regulation Under 40 CFR 261.4 (b)

**SHIPPER:** USA Environmental, Inc.

**PROJECT ADDRESS / LOCATION:**

**CITY, STATE, ZIP:**

**PROJECT CONTACT AND TELEPHONE NUMBER:**

**USACE IDENTIFIER / INSTALLATION NAME OR CONTRACT #:**

**UNIQUE CONTAINER # (i.e., 0001 of 0001):**                      **of**

**UNIQUE SEAL IDENTIFICATION #:**

Date:	Seal Number:	1 <sup>st</sup> Initials:	2 <sup>nd</sup> Initials:	Comments:

☐ DD Form 1348-1A                      ☐ 100% Material Inspection and Release Form

**NOTE:**    See DD Form 1348-1A For Additional Information.  
               Check box(s) if DD Form 1348-1A and/or the 100% Inspection Form  
               will accompany this shipment.

**CONTACT INFORMATION:**      USA Environmental, Inc.  
    720 Brooker Creek Blvd., Suite 204  
    Oldsmar, FL. 34677  
    (813) 343-6336

PROCEDURE No.: SOP 8  
DESCRIPTION: MPPEH MANAGEMENT  
REVISION No.: FINAL  
DATE: SEPTEMBER 2013  
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PROCEDURE No.: SOP 8

DESCRIPTION: MPPEH MANAGEMENT

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#### **ATTACHMENT 4.**

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#### **PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**

PROCEDURE No.: SOP 8

DESCRIPTION: MPPEH MANAGEMENT

REVISION No.: FINAL

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PROCEDURE NO.: SOP 8

DESCRIPTION: MPPEH MANAGEMENT

REVISION NO.: FINAL

DATE: SEPTEMBER 2013

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE  
SITE 12 EOD AREA  
N62470-11-D-8007 CTO WE01  
MPPEH MANAGEMENT**

TEAM INFORMATION		
<b>Team:</b>	<b>Location:</b>	<b>Date:</b>
<b>Team Leader:</b>		
<b>Personnel Present:</b>		
<b>Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i></b>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	<b>SOP 8 Workers' Statement</b>	Have all Surface Clearance and Intrusive Team Members reviewed SOP 8, MPPEH Management?				(P)
2	<b>MEC QAPP WS#7&amp;8</b>	Are all Surface Clearance, Intrusive and Disposal Team Members qualified in accordance with MEC QAPP WS #7&8?				(P), (I), (F)
3	<b>SOP-8, Sec. 9</b>	Has all recovered MPPEH undergone a 100% inspection and an independent 100% re-inspection?				(P), (I), (F)
4	<b>SOP-8, Sec. 9 &amp; 10</b>	Was Material Inspection Release Form completed, to document the two independent 100% inspections?				(P), (I), (F)
5	<b>SOP-8, Sec. 9</b>	Were inspected items properly classified as MDAS or MDEH, as verified through random sampling by the UXOQCS?				(P), (I), (F)
6	<b>SOP-8, Sec. 9</b>	Has the Team Leader ensured no co-mingling of MDAS and MDEH?				(P), (I), (F)
7	<b>SOP-8, Sec. 9</b>	Has the SUXOS conducted random checks of munitions debris and range related debris to ensure there are no explosives hazards?				(P), (I), (F)
8	<b>SOP-8, Sec. 9</b>	Has all MDEH been demil/demo/de-fluid as necessary to remove any hazards?				(P), (I), (F)
9	<b>SOP-8, Sec. 9</b>	Once demil/demo/de-fluid as required, were materials 100% inspected and 100% re-inspected in order to classify as MDAS?				(P), (I), (F)



PROCEDURE No.: SOP 8

DESCRIPTION: MPPEH MANAGEMENT

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CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
10	SOP-8, Sec. 10	Has all properly inspected debris been secured in sequentially numbered, labeled containers?				(P), (I), (F)
11	SOP-8, Sec. 10 & Attach. 3	Are container labels properly filled-out?				(P), (I), (F)
12	SOP-8, Sec. 10 & Attach. 1	Is the appropriate statement used to certify that materials are free from explosives or other hazards incorporated on the DD Form 1348-1A for each container?				(P), (I), (F)

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FINDINGS	
Item	Comments

33      Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**MEC MANAGEMENT AND DISPOSAL**

**SOP 9**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 9

DESCRIPTION: MEC MANAGEMENT AND DISPOSAL

REVISION No.: FINAL

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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- SITE 12 EOD Area Remedial Investigation Work Plan (WP)
- Accident Prevention Plan (APP)
- NAVSEA OP 5, Volume 1, Seventh Revision, Ashore
- EODB 60A-1-1 31, EOD Disposal Procedures
- 27 CFR 555, Commerce in Explosives
- FM 5-250, Explosives and Demolitions
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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PROCEDURE No.: SOP 9

DESCRIPTION: MEC MANAGEMENT AND DISPOSAL

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### 3. ACRONYMS AND ABBREVIATIONS

APP	Accident Prevention Plan
BIP	Blow in Place
CCBC	counter-charged on the bottom centerline
CFR	Code of Federal Regulations
CPR	Cardiopulmonary Resuscitation
DOD	Department of Defense
DS	Demolition Supervisor
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FM	Field Manual
GPS	Global Positioning System
HE	High Explosive
MDAS	Material Documented as Safe
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
OSHA	Occupational Safety and Health Administration
PDA	Personal Digital Assistant
PETN	Pentaerythritol Tetranitrate
PPE	Personnel Protection Equipment
RPM	Remedial Program Manager
SOP	Standard Operating Procedures
SHSP	Site Health and Safety Plan
SUXOS	Senior UXO Supervisor
TBD	To Be Determined
TEU	Technical Escort Unit
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
USEPA	U. S. Environmental Protection Agency
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

PROCEDURE No.: SOP 9

DESCRIPTION: MEC MANAGEMENT AND DISPOSAL

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UXO

Unexploded Ordnance

WP

Work Plan

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ATTACHMENT 1. DEMOLITION EQUIPMENT CHECKLIST

ATTACHMENT 2. HEALTH AND SAFETY EQUIPMENT CHECKLIST

ATTACHMENT 3. GENERAL SAFETY PRECAUTIONS

ATTACHMENT 4. DISPOSAL OPERATIONS CHECKLIST

ATTACHMENT 5. EXPLOSIVE DISPOSAL LOG

ATTACHMENT 6. QUALITY CONTROL SURVEILLANCE CHECK SHEET

ATTACHMENT 7, BRUNSWICK SITE ACCESS FORM



PROCEDURE No.: SOP 9

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**4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL**

This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) UXO-qualified personnel to conduct munitions and explosives of concern (MEC) management and disposal procedures during the activities Site 12 EOD Area of the former Naval Air Station (NAS) Brunswick, Brunswick, ME. By their signatures, the undersigned certify that this SOP is approved for implementation at the project area and will be used to direct MEC management and disposal operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:

  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:12:50 -04'00'

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

PROCEDURE No.: SOP 9

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## **7. PROCEDURES**

### **7.1 PURPOSE**

This document provides MEC management and basic explosive demolition procedures for the treatment of MEC and material potentially presenting an explosive hazard (MPPEH) found during the MEC activities at the project area. These procedures will be conducted in accordance with the WP, the Site Health and Safety Plan (SHSP), and the Explosives Safety Submission (ESS).

### **7.2 SCOPE**

This SOP provides the detailed information needed to safely configure and conduct demolition procedures and perform post demolition inspection and area restoration.

### **7.3 MEC MANAGEMENT**

When MEC and MPPEH are discovered, they are inspected and positively identified using a three-tiered inspection process. They are inspected:

- firstly by the UXO technician discovering the item(s), to determine if it is MEC or MPPEH;
- secondly by the Team Leader, to independently classify the item(s); and
- thirdly by the Senior UXO Supervisor (SUXOS), UXO Quality Control Specialist (UXOQCS), or UXO Safety Officer (UXOSO).

The SUXOS and UXOSO must assess MEC items and agree that the risk associated with movement is acceptable. They will document the decision in writing before transporting the items to the designated consolidation area. MEC items that the SUXOS and UXOSO determine are unacceptable to move, will be conspicuously marked, secured and scheduled for Blow-in-Place (BIP) treatment by a demolition team.

MPPEH items will be further classified as material documented as safe (MDAS) or will remain classified as MPPEH. The chain of custody documentation will be initiated and the items segregated and stored so that comingling of the materials (MDAS and MPPEH items) will not occur (see SOP 8 for procedures to manage and dispose of MDAS).

MPPEH may be transported to the temporary storage magazine, or consolidation location as appropriate, for temporary storage.

All MEC and MPPEH is photographed, and as much information as possible is recorded on the dig sheet and in the Team Leader's logbook. Recorded data will include nomenclature (if known), type (projectile, mortar, rocket, mine, deck marker, etc.), size, physical condition, fuze or unfuze and fuze type by function (e.g., point detonating, mechanical time, etc.), condition (e.g., fired or unfired, armed or unarmed), filler, if known, Global Positioning System (GPS) coordinates (if different from the relocated position), and depth. One hundred percent of MEC and MPPEH are inspected using this three-tiered inspection process.

### **7.4 MEC AND MPPEH TREATMENT**

#### **7.4.1 Notifications**

The SUXOS will ensure that the agencies responsible for emergency response (fire department and airport operations) are notified as far in advance as possible that disposal activities will be taking place.

The notifications should address scheduling, evacuations, road closures, exclusion zones (EZs), and any other required support. Table 1 provides a list of emergency telephone numbers and contacts.

**Table 1: Brunswick NAS Emergency Contact Numbers**

Contact	Phone Number
Ambulance	911
Fire Department	911
Fire Department (non-emergency): Central Station - 21 Town Hall Place, Brunswick, Maine 04011-2003	(207) 725-5541
Police	911
Mid Coast Hospital	207-729-0181
Occupational Health Clinic: US Health Works	202-725-2697
NAVFAC RPM, Todd Bober	215-897-4911
Poison Control Hotline	1-800-222-1222
USEPA National Response Center	1-800-424-8802
CHEMTREC	1-800-424-9300
Federal OSHA Emergency Hotline	1-800-321-OSHA (6742)
TEU (duty hours)	410-671-3601
TEU (after duty hours)	410-671-2773
EOD Mobile Unit 12 Detachment Newport, RI	401-832-3301
USA Program Manager, Doug Ralston	813-343-6368
USA Project Manager, Robert Hierholzer	813-343-6339
USA Corporate Health and Safety Manager, Cheryl M. Riordan, CSP	813-426-2112
USA Director of Safety and Quality Robert Crownover	813-343-6364

#### **7.4.2 Exclusion Zones and Road Closures**

The SUXOS will ensure the EZ barricades are set up with signs at all access roads and are marked appropriately: Danger, UXO Remediation Project in Progress, DO NOT ENTER, and list contact information on the barricade sign.

Table 2 provides the primary and contingency EZ for the project area. However, for intentional detonations, the intent is to use engineering controls for reduction of the EZ and as authorized by DDESB TP-16 (DDESB 2009). Buried Explosion Module sheets (engineering controls) are included in Appendix B of the ESS.

**Table 2 Exclusion Zones for the Site 12 EOD Area, Brunswick NAS (Table 3-1 of the ESS)**

MGFDs		EZs (ft)				
Description	NEW (lbs) <sup>(1)</sup>	Fragmentation Effects		Blast Overpressure Effects		
		HFD <sup>(1)</sup>	MFD <sup>(1)</sup>	K328 <sup>(1)</sup>	K40 <sup>(1)</sup>	K24 <sup>(1)</sup>
40-mm Mk 2 projectile (Primary)	0.187	132	1095	188	23	14
90-mm M71 projectile (Contingency)	1.16 <sup>(2)</sup>	288	1939	410	50	30

1. From Fragmentation Data Review Form, database revision date 16 April 2013.

2. TNT Equivalent NEW.

#### 7.4.3 Weather and Environmental Considerations

Prior to commencing disposal operations the SUXOS or UXOSO will obtain a local weather report. Disposal operations will not be conducted if electrical storms are within 6 miles of the disposal site or during severe weather conditions that would impact safety.

The SUXOS and UXOSO will make a determination on whether wind speed and visibility (minimum 600-ft) will hamper the safe execution of disposal operations.

#### 7.4.4 Emergency Medical Support

The emergency contact telephones numbers are listed in Table 1.

At least two UXO technicians on each demolition team will be trained in first aid and cardiopulmonary resuscitation (CPR).

A first aid kit, portable eyewash, and blood-borne pathogen kit will be on-site at all times. The first aid kit will contain dressings capable of treating traumatic injuries that could result from an explosion.

#### 7.4.5 Fire Support

The fire department will be notified of the location and duration of disposal operations. A 20-lb ABC fire extinguisher and shovels will be on-site to fight small fires; personnel will not attempt to extinguish fires involving explosives. Personnel will evacuate the area if the fire approaches ordnance or explosives.

#### 7.4.6 UXO Personnel Requirements

Explosive demolition operations require specific organizational roles and personnel assignments, specifically:

- A Demolition Supervisor (DS) who is responsible for planning, directing, and executing all disposal operations
- A UXOSO who ensures that all work is performed safely and in accordance with the approved site-specific plans
- A minimum of three UXO Technicians per team who conduct disposal operations
- One UXO Technician III who is designated as the DS.
- Two UXO Technicians (level II or I) who assist the DS.



The UXOSO acts as safety observer; this individual is located in the safe area and maintains visual contact with the team down range. He/she maintains communications with the team, the SUXOS, and USA Site Field Office.

#### **7.4.7 Pre-Treatment/Demolition Briefing**

The DS will brief all personnel involved in range operations in the following areas:

- Type of MEC and MPPEH being destroyed
- Type, placement, and quantity of demolition material being used
- Method of initiation (electric)
- Means of transporting MEC and MPPEH
- Route to the disposal site
- Equipment being used (e.g., Remote Firing Device (RFD), galvanometer, blasting machine, firing wire, etc.)
- Misfire procedures
- Post-shot cleanup of range.

#### **7.4.8 Demolition Procedures Review**

Before any disposal operations commence, all technicians assigned to or working with disposal teams will attend a site-specific orientation. The purpose of the orientation will be to review MEC and MPPEH disposal and emergency response procedures. The topics to be covered during the orientation will include, but are not limited to:

- Accident Prevention Plan (APP)
- SHSP
- This SOP
- Demolition firing systems and components
- Disposal charge placement
- Explosives transportation
- Site ordnance briefing
- Engineering controls
- Type and condition of MEC and MPPEH
- Emergency response equipment
- Emergency procedures
- Team assignments.

### **7.5 EXPLOSIVE OPERATIONS**

The SUXOS will oversee all MEC and MPPEH treatment operations.

#### **7.5.1 Initiation Sequence**

The SUXOS or DS will ensure that the actions taken prior to initiating a demolition shot are completed as follows.

- Ensure all required notifications have been made.

- Set up the EZ and post guards at the barricades.
- Visually inspect the EZ and surrounding area for unauthorized personnel.
- Announce on the radio that air-horn demolition warnings will follow.
- **Five-minute warning.** The SUXOS/DS will give the five-minute warning on the radio, followed by a one minute blast on the air-horn.
- **One-minute warning.** The SUXOS/DS will give the one-minute warning on the radio, followed by a one minute blast on the air-horn prior to the shot.
- Prior to initiating the shot, the SUXOS/DS will give three loud "*Fire in the Hole!*" warnings and then give the "fire" command on the radio.
- When the area has been cleared (post-blast), the SUXOS will sound a prolonged blast on the air-horn.
- The SUXOS/DS will announce on the radio that demolition operations have ceased.

### 7.5.2 Initiation Systems

The firing system will use the RFD with electric blasting caps in accordance with EODB 60A1-1-31. As a back-up contingency to the RFD, the HR1 Non-electric starter or the HBR Scorpion will be used to initiate the electrical firing system.

### 7.6 non-el use (shock tube)

The following requirements are necessary when using NON-EL (Shock Tube) systems:

- After cutting a piece of shock tube, either immediately tie a tight overhand knot in one or both cut ends or splice one exposed end and tie of the other.
- Always use a sharp knife or razor blade to cut shock tube so as to prevent the tube from being pinched or otherwise obstructed.
- Always cut shock tube squarely across and make sure the cut is clean.
- Use only the splicing tubes provided by the manufacturer to make splices.
- Every splice in the shock tube reduces the reliability of the priming system; therefore keep the number of splices to a minimum.
- Always dispose of all short, cut-off pieces in accordance with local laws as they relate to flammable material.

The shock tube system is a thin plastic tube of extruded polymer with a layer of Pentaerythritol Tetranitrate (PETN) coated on its interior surface. The PETN propagates a shock wave, which is normally contained within the plastic tubing. The shock tube offers the controlled instantaneous action of electric initiation without the risk of premature initiation of the detonator by radio transmissions, high-tension power lines, or static electricity discharge. The NON-EL system uses detonators in the bunch blocks and in the detonator assembly, which are to be handled in accordance with approved procedures.

The high reliability of the shock tube initiating system is due to the fact that all of the components are sealed and, unlike standard non-electric priming components, cannot be easily degraded by moisture. Cutting the shock tube makes the open end vulnerable to moisture and foreign contamination; therefore,

care must be taken to prevent moisture and foreign matter from getting in the exposed ends of the shock tubes.

### 7.6.1 Shock Tube Demolition Procedures

#### WARNING

Although the detonation along the shock tube is normally contained within the plastic tubing, burns may occur if the shock tube is held.

### 7.6.2 Shock Tube Assembly

- Spool out the desired length of shock tube from firing point to demolition site and cut it off with a sharp knife or razor blade. Weight down the loose end of trunk line.
- Immediately seal off the shock tube remaining on the spool by tying a tight overhand knot in the cut-off end or use a push-over sealer.
- Using a sharp knife or razor, cut the sealed end off the detonator assembly.
- Push one of the shock tube ends to be spliced firmly into one of the pre-cut splicing tubes provided by the manufacturer at least  $\frac{1}{4}$  inch. Push the other shock tube end firmly into the other end of the splicing tube at least  $\frac{1}{4}$  inch. Secure splice with tape if needed.

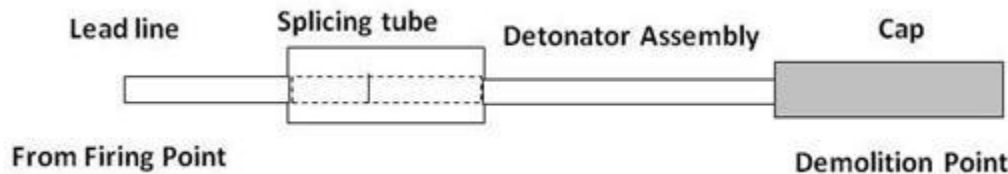


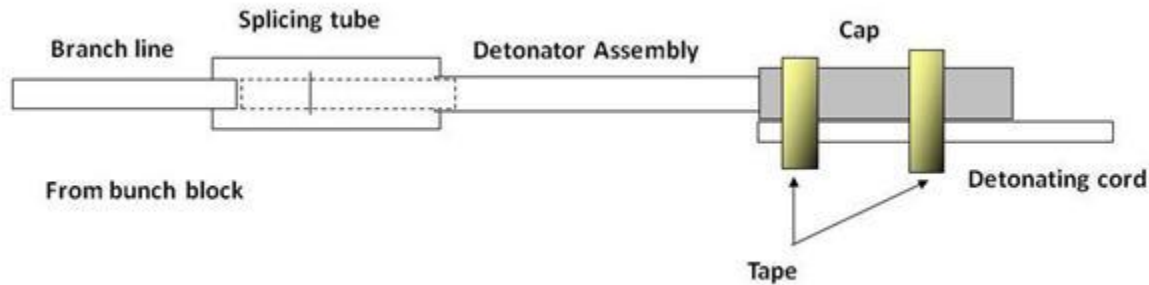
Figure 1

### 7.6.3 Firing Assembly Setup

- 1) If there are multiple items to be destroyed using bunch block(s) supplied by the manufacturer, lay out lead lines at demo site to the shot(s) and secure the bunch block with a sandbag, or some other item which will keep it from moving.

**NOTE:** No more than six leads may be used from any one bunch block.

- 2) If the detonator assembly has not been attached yet, then, using the splicing tube, splice the detonator assembly to the shock tube branch line as explained in the splicing instructions above.
- 3) If this is a non-tamped shot, place the detonator assembly into the demolition material. If the shot is to be tamped, then prepare the demolition material with a detonating cord lead long enough to stick out of the tamping at least 1 ft.
- 4) Tape the detonator assembly with cap to the detonating cord lead as shown in Figure 2.



**Figure 2**

- 5) Return to the firing position.
- 6) Cut off the sealed end of shock tube, proceed to the directions listed in Step 7. If you are using a previously cut piece of shock tube, using a sharp knife or razor blade cut approximately 18 inches from the previously cut end, whether or not it was knotted in accordance with the above guidance.
- 7) Insert a primer into the firing device and connect the shock tube lead line to the firing device ensuring that the shock tube is properly seated in the firing device.
- 8) Take cover.
- 9) Signal **"Fire in the hole"** three times and initiate charge.
- 10) Observe a 5-minute wait time after the detonation.
- 11) Remain in designated safe area until Demolition Supervisor announces **"All Clear."**

#### **7.6.4 Preparing Electric Detonators (Caps) for Initiation**

To prepare electric blasting caps for initiation, the procedures listed below will be followed:

- Prior to making connection with the electric blasting cap, the firing circuit will be continuity tested.
- All parts of the firing circuit will be kept insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray current.
- The shunt will not be removed from the wires until the individual performing the operation has been grounded. Electric blasting caps will be connected to the firing circuit before connection to the main initiation charge.
- Electric blasting caps of different manufacturers or types will not be used in the same system.
- The electric blasting caps will be tested for continuity with a galvanometer at least 50 ft downwind from any explosives prior to connecting them to the firing circuit. After the testing is completed, the lead wires will be short-circuited by twisting the bare ends of the wires together. The wires will remain shunted until ready to connect to the firing circuit.
- The electrical lead wires of electric blasting caps, detonators, or other electro-explosive devices should not be pulled; detonation may occur.

- The legs should be unrolled so that the cap is as far as possible from the operator and pointing away from him.
- The blasting cap will be placed in a hole or behind a barricade before removing the shunt and testing for continuity. The cap should not point toward other personnel or explosives.
- Only authorized and serviceable testing equipment will be used.
- The remote receiver will not be connected to the firing wires until all pre-firing tests have been completed, and all preparations have been made to fire the charge.
- The blasting cap will not be held directly in the hand when un-coiling the leads. The wires will be held approximately 6 inches from the cap. This will minimize injury should the cap explode. The lead wires should be straightened by hand and not thrown, waved, or snapped to loosen the coils.
- The shunt will not be removed from the lead wires of blasting caps except when testing for continuity or actual connection into the firing circuit. The individual removing the shunts should be grounded prior to performing this operation to prevent accumulated static electricity from firing the blasting cap.

#### **7.6.5 Preparing Donor Charges for Initiation**

To prepare the explosive charge for initiation, the procedures listed below will be followed.

- Prepare and place all explosive charges.
- After locating a firing position a safe distance away from the charges.
- Ground yourself. Test the blasting caps by removing the short circuit shunt. Touch one end of the cap lead wire to one post and other cap lead wire to other post of the galvanometer. The galvanometer's needle should deflect at least half scale, if not; the cap is defective and should not be used. When testing is complete, ensure cap lead wires are twisted together.
- Connect blasting cap lead wires to the remote receiver after checking it for static electricity.
- Request permission to prime from the SUXOS and, when granted, connect the blasting caps to the donor charges.
- Depart to firing point.
- Take cover.
- Obtain a head count.
- Ground yourself.
- Test entire circuit using test procedures for RFD. This should cause the lamp to glow. If the firing circuit is defective. Then go down-range and recheck circuits. If a wire is found defective replace the wire, if a splice is found defective disconnect and re splice the wires. If the cap is found defective, replace it. Retest the entire circuit again to make sure that all breaks have been located before attempting to fire.

- Follow the instructions in RFD manual.
- Request permission to initiate the charge(s) from the SUXOS.
- When granted permission, make three announcements of "Fire in The Hole" on the radio and three long blasts on the safety vehicle's horn, and then initiate the charge.
- Observe a 5-minute wait time after the detonation. This wait time may be waived by the SUXOS based on observation of the detonation.

#### **7.6.6 Post Demolition/Treatment Procedures**

The SUXSO and UXOSO will examine the demolition site while all other personnel remain in the safe area. Once the SUXOS gives the all-clear, the team will conduct the following procedures:

- Check demolition area for low orders or kick outs.
- Examine the area for, and remove any munitions debris remaining after the treatment procedures.
- Backfill hole, as necessary.
- Recover all equipment.

#### **7.6.7 Misfire Procedures**

A thorough check of all equipment, firing wire, and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below will be followed.

##### **7.6.7.1 Electric Misfires**

If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below.

- Follow procedures contained in the RFD Manual.
- If unsuccessful, commence a 30-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the designated technician will proceed down range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires, check the replacement detonator for continuity, connect the new detonator to the remote receiver, and prime the charge without disturbing the original detonator.
- Follow normal procedures for effecting initiation of the charge.

##### **7.6.7.2 Non-el Misfire**

The use of a shock tube for blast initiation can present misfires, which require the following actions:

- If charge fails to detonate, it could be the result of the shock tube not firing. Visually inspect the shock tube; if it is not discolored (i.e., slightly black), it has not fired.
- If it has not fired, cut a 1 ft piece off the end of the tube, re-insert the tube into the firing device, and attempt to fire again.
- If the device still does not fire, wait 60 minutes and proceed down range to replace the shock tube per the instructions outlined below.
- If the tube is slightly black, then a "Black Tube" misfire has occurred, and the shock tube will have to be replaced, after observing a 60-minute wait time. When replacing the shock tube, be sure to remove the tube with the detonator in place. Without removing the detonator from the end of the tube, dispose of by demolition.

### **7.6.7.3 Detonating Cord Misfire**

USA uses detonating cord to tie in multiple demolition shots, and to ensure that electric detonators are not buried. In addition to the electrical misfire procedures above, the following will be conducted.

- If there is no problem with the initiating system, wait the prescribed amount of time, and inspect the initiator to the cord connection to ensure it is properly connected. If it was a bad connection, simply attach a new initiator, and follow the appropriate procedures in Paragraph 4.3.3.
- If the initiator detonated and the cord did not, inspect the cord to ensure that it is detonating cord and not time fuze. Also, check to ensure that there is Pentaerythritol Tetranitrate (PETN) in the cord at the connection to the initiator.

It may be necessary to uncover the detonating cord and replace it. This must be accomplished carefully, to ensure that the donor charge and the MEC item are not disturbed

## **7.7 RECORDKEEPING**

Forms and checklists should be generated and/or modified to meet site-specific requirements. The forms provided in this SOP may be used, or alternate forms containing the same information may be used. The SUXOS will make this determination. For disposal operations, the SUXOS or the UXO DS will, at a minimum, complete the following.

- General Safety Precautions (Attachment 3)
- Disposal Operations Checklist (Attachment 4)
- Explosive Disposal Log (Attachment 5)

## **7.8 QUALITY CONTROL**

MEC Management and Disposal operations will meet the quality control (QC) metrics listed on the QC Surveillance check sheet (Attachment 6).

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any tasks the QC team determines do not meet the quality control metrics will be considered deficient or non-conforming. If the deficiency or nonconformance cannot be resolved immediately, the UXOQCS will prepare a nonconformance report and submit to the SUXOS. The UXOQCS will conduct an analysis of the cause of the deficiency or nonconformance and

prepare and submit a response to the Project Quality Control Manager and the Project Manager within 48 hours.

## 8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 3) lists the existing and potential hazards associated with conducting MEC management and disposal tasks along with methods to mitigate the hazards.

**Table 3: Hazard Analysis Matrix**

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
MEC Management and Disposal	Slips, Trips or Falls	Climbing; debris, holes or crevasses obstructed from view by vegetation.	C/III/4	Assess surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Hot Weather	Seasonal weather patterns.	C/III/4	Monitor for heat stress: provide cool drinking water, work-rest schedule, and cool shelter for breaks. Use sunscreen.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keep the feet dry (carry extra socks) Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects.	C/III/4	Avoid biological hazards. Wear long sleeve garments and apply repellent to exposed skin as needed. Use barrier cream, as necessary.	D/IV/5
	MEC/MPPEH	MEC/MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	All personnel will wear cotton clothing Maintain the team separation distance between teams for the Project Area (see the hazard control briefing that follows) All personnel will receive a safety briefing prior to commencing site activities Make all emergency notifications prior to commencing demolition operations. Establish the EZ as listed in Table 2. Demolition operations will not take place if electrical storms are within 6 miles.	D/II/4
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5



## **8.1 HAZARD CONTROL BRIEF**

At the beginning of each work day, the SUXOS or his/her designee will hold a briefing in accordance with the requirements of the approved WP and the SHSP. All personnel will attend the tailgate safety briefing given by the Team Leader on the existing and potential hazards prior to commencing any activities in the Project Area. The demolition Team Leader will brief all personnel on the operation, covering topics listed in the Health and Safety Checklist, Attachment 2.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the terrain. All personnel will be aware of the signs of heat stress or cold stress as described in Section 9.14 of the APP and be able to recognize the onset of heat or cold stress disorders in themselves and their team members.

Wear long sleeve (cotton) clothing and apply insect repellant as warranted to mitigate the impact of biting/stinging insects.

The EZ, as listed Table 2, will be established and maintained throughout the MEC Management and Disposal tasks.

All personnel will strictly adhere to the directions of the demolition Team Leader throughout the demolition operation. All personnel will be moved outside the appropriate maximum fragmentation distance (MFD) in Table 2 and accounted for prior to initiation of donor charges during disposal tasks. Personnel will remain outside of the MFD until the SUXOS and UXOSO recon the disposal site and give the all clear.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the SHSP.

## **9. DIAGRAMS**

The site maps are located in Appendix A of the WP. Teams will be provided maps of the overall project site and evacuation routes.

## **10. EQUIPMENT**

The UXO teams conducting MEC management and disposal tasks will be equipped with the following:

- Handheld all-metals detector
- Disposal equipment (Demolition Equipment Checklist, Attachment 1)
- Donor explosives
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

Safety equipment required includes the following:

- Health and Safety Equipment (Health and Safety Equipment Checklist, Attachment 2)
- Level D PPE
- Inclement weather gear as needed.

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## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SHSP, Section 10.2, will be followed. A copy of the SHSP is maintained in all project site vehicles.

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ATTACHMENT 1.  
DEMOLITION EQUIPMENT CHECKLIST

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## DEMOLITION EQUIPMENT CHECKLIST

### Equipment List

Equipment	Quantity	Comments
Explosive Vehicle(s)		
Personnel Vehicle(s)		
Digital Camera		
Air Horn		
Handheld Radios		
Satellite Telephone(s)		
Remote Firing Device		
White XLT all-metals detector		
Shovel, round point, long handle		
Shovel, round point, short handle		
Blasting Machine		
Tape, duct		
Tape, measuring, 50- or 100-meter		
Tape, electricians, plastic		
Toolbox, general hand tools		
Galvanometer		
IME-22 container		
Knife		
Initiating explosives		
Donor explosives		
Fire Extinguishers, 20B:C		
Wheel Chocks		

### Checklist Verification

Disposal Supervisor Signature:

Date:

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**ATTACHMENT 2.**  
**HEALTH AND SAFETY EQUIPMENT CHECKLIST**



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## HEALTH AND SAFETY EQUIPMENT CHECKLIST

### Equipment List

Equipment	Quantity	Comments
Air Horn, emergency		
Burn Blanket		
Burn Kit		
Emergency Eye Wash		
Hand-held Radio and Satellite Phone		
Lightning Detector		
Fire Extinguisher, 20-pound ABC		
Blood-borne Pathogen Kit		
First Aid Kit		
Gloves, leather		
Goggles		
Face Shield(s)		
Fire Retardant Gloves		
Fire Retardant Apron(s)		
Rain Suit(s)		
Safety Vest(s)		
Stretcher		
Water, 5-gal bottle (emergency shower)		
Water, drinking -- 1 liter per person		

### Checklist Verification

Disposal Supervisor Signature:

Date:

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**ATTACHMENT 3.  
GENERAL SAFETY PRECAUTIONS**

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## GENERAL SAFETY PRECAUTIONS

1. Carry blasting caps in approved containers and keep them out of the direct rays of the sun. Keep the caps located at least 25 feet from other explosives until they are needed for priming.
2. Do not work with electric blasting caps or other electro-explosive devices while wearing clothing prone to producing static electricity such as nylon, silk, synthetic hair, etc.
3. Do not use explosives or accessory equipment that is obviously deteriorated or damaged. They may cause premature detonation or fail completely.
4. Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
5. Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
6. Use electric blasting caps of the same manufacturer for each demolition shot involving more than one cap.
7. Do not use improvised methods for initiating blasting caps.
8. Do not bury blasting caps. Use detonating cord to transmit the explosive wave from the blasting caps, on the surface, to a buried/tamped explosive charge. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.
9. Test electric-blasting caps for continuity at least 50 feet from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.
10. In the event of a misfire when firing electrically and when disposing of explosives by detonation, do not approach the disposal site for at least 30 minutes after the expected detonation time.
11. Items with lugs, strong backs, tail-booms, base plates, etc., should be oriented away from personnel locations.
12. Consideration should be given to tamping the UXO to control fragments if the situation warrants. Fragments will be minimized not only to protect personnel but also property such as buildings, trees, etc.
13. Avoid inhaling the smoke, dust or fumes of burning pyrotechnic or incendiary materials. The smoke, dust and fumes from many of these materials are irritating and/or toxic if inhaled.
14. Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.
15. Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded MEC. Safety measures for personnel and property must be based upon this possibility.
16. Inert ordnance will not be disposed of, or sold for scrap, until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined. All requirements of the UXO Procedure for the Management and Disposition of MPPEH will be met prior to releasing any inert ordnance material.
17. Maintain minimum safe distances between electromagnetic-radiating sources and electro-explosive devices (IAW EODB/TM-TO 60A-1-1-12).
18. Do not conduct blasting or demolition operations during an electrical, dust, sand, or snowstorm severe enough to produce atmospheric static electrical charges, or when such a storm is nearby.

(within 6 miles). Under such conditions, all operations will be suspended or terminated, cap and lead wires shunted, and personnel removed from the demolition area. Demolition operations will also be terminated if visibility becomes less than 600 feet.

19. Loose initiating explosives, lead azide, mercury fulminate, lead styphnate, and tetracene manifest extreme sensitivity to friction, heat, and impact. Extra precautions are required when handling these types of explosives. Keep initiating explosives in a water-wet condition at all times, until ready for final preparation for detonation. Sensitivity of these explosives is greatly increased when dry.
20. Exercise extreme care when handling and preparing high explosives for detonation. They are subject to detonation by heat, shock, or friction.
21. Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
22. Photo flash bombs must be handled with the same care as black powder-filled munitions.
23. MEC containing white phosphorous will not be detonated into the ground. White phosphorous munitions will be counter-charged on the bottom centerline (CCBC) when possible.
24. A search of the detonation site, after the demo operation, will be conducted to assure complete disposal was accomplished.
25. Do not abandon any explosives.
26. Do not leave explosives, empty cartridges, boxes, liners or other materials used in the packing of explosives lying around where children, unauthorized persons or livestock can get at them.
27. Do not allow any wood, paper or other materials used in packing explosives to be burned in a stove, fireplace, or other confined space, or be re-used for any other purpose. Such materials will be destroyed by burning at an isolated location out of doors, with no one allowed within 100 feet of the burning operation.
28. Do not fight fires involving explosive material. Evacuate all personnel to a safe location and secure the area.
29. Know and observe federal, state, and local laws/regulations that apply to the transportation, storage, and use of explosives.
30. Do not permit metal, except approved metal truck bodies, to contact explosive containers.
31. Do not transport metal, flammable, or corrosive substances with explosives.
32. Do not allow smoking, or the presence of unauthorized personnel, in vehicles transporting explosives.
33. Carefully load and unload explosives from vehicles. Never throw or drop explosives from the vehicle.
34. Assure the load is blocked and braced to prevent it from movement and displacement.
35. Do not drive vehicles containing explosives over public highways until all permits and certifications have been obtained from the state enforcement agencies.
36. All routes must be approved in writing prior to transporting explosive materials over public highways.
37. Licensed commercial carriers will conduct the shipment of explosive materials over public highways unless USA UXO personnel have been specifically licensed and certified to make the shipment.
38. Never leave a vehicle that is loaded with explosives unattended.
39. Do not store blasting caps, detonators, or other items containing initiating explosives in the same box, container, or magazine with other explosives.
40. Store explosive materials in military or ATF-approved magazines only. Ensure the magazines used for storage comply with quantity distance requirements for the class of explosive material

they contain. Reference documents include: NAVSEA OP-5, TM 9-1300-206, AMCR 385-100, ATF - Explosives Law and Regulation, ATF P 5400.7, and 49 CFR.

41. Do not store spark-producing metal/tools in an explosive magazine.
42. Do not permit smoking, matches, or any source of fire or flame within 100 feet of an explosive magazine.
43. Do not allow leaves, grass, brush, or debris to accumulate within 50 feet of an explosive magazine.
44. Do not permit the discharge of firearms within 300 feet of an explosive magazine.
45. Do not use any alkaline material such as lye, washing soda, or soap to remove TNT exudate. Alkaline materials will react with TNT to render it more sensitive.
46. Do not permit smoking, matches, or other sources of fire or flame within 100 feet of an area in which explosives are being handled.
47. Do not expose explosives or devices containing explosive to prolonged exposure to direct sun light. Such exposure can increase sensitivity and deterioration.
48. Ensure all unused explosives are returned to their proper containers and the container closed after use.
49. Do not carry explosives or explosive components in pockets or on the body.
50. Do not strike, tamper with, or attempt to remove or investigate the contents of an electric/non-electric blasting cap, detonator, or other explosive initiating device. A detonation may occur.
51. Do not pull on the electrical lead wires of electric blasting caps, detonators, or their electro-explosive devices. A detonation may occur.
52. Do not attempt to remove an unfired or misfired primer or blasting cap from a base coupling. There is a high risk of an explosion.
53. Do not allow unauthorized or unnecessary personnel to be present when explosives are being handled.
54. Do not use pull rings or safety pins to lift or handle explosive devices.



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**ATTACHMENT 4.  
DISPOSAL OPERATIONS CHECKLIST**

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	<b>DISPOSAL OPERATIONS CHECKLIST</b>	
FUNCTION	DATE/TIME	SIGNATURE
<b>SUXOS</b>		
Assign Disposal Team		
Brief Disposal Team Review emergency procedures Discuss MEC/MPPEH to be disposed of Describe Disposal procedures and method		
Inspect Range/Exclusion Zone upon completion of operations		
<b>Disposal Supervisor</b>		
Assign demolition task to team members		
Verify Not Later Than (NLT) disposal time includes wait time for misfire procedures		
Verify roads are closed		
Verify Exclusion Zone boundaries in place		
Complete health and safety and equipment checklists		
Ensure Field Site Office has completed the verification checklist Responsible activity Medical Facility Fire Department Security/Police Department		
Disposal Supervisor tailgate safety brief includes: Designating emergency vehicles Designating emergency evacuation route Reviewing emergency response procedures		
Verify daily equipment inspection		
Verify detonators are separated from explosives		
Verify area has been evacuated		
Verify engineering controls are correct		
Notify Field Site Office that operations are commencing		
Start disposal activities		
Inspect shot after designated wait time		
Collect all metal fragments for later disposal		
Perform QC check		
Stop disposal activities		
Perform QA check (if required)		

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USA will notify upon completion: Client Responsible Activity Medical Facility Fire Department Security/Police Department		
Complete MEC/MPPEH Accountability Log		
Record data in Explosive Disposal Log		
Demolition Supervisor signature:	Date:	

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**ATTACHMENT 5.  
EXPLOSIVE DISPOSAL LOG**

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## EXPLOSIVE DISPOSAL LOG

### Project Information

Project Name: \_\_\_\_\_

Start

Time: \_\_\_\_\_

Project

Location: \_\_\_\_\_

Stop Time: \_\_\_\_\_

### MEC Disposed of This Date (List items and quantity of each item)

### Donor Explosive Used (List types and quantity)

### Remarks

### Approval

Demolition Supervisor: \_\_\_\_\_

Date: \_\_\_\_\_



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**ATTACHMENT 6.  
QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE  
N62470-11-D-8007 CTO WE01**

**MEC MANAGEMENT AND DISPOSAL**

TEAM INFORMATION		
Team:	Location:	Date:
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	<b>SOP 9 Workers' Statement</b>	Have all MEC Management and Disposal Team Members read this SOP?				(P)
2	<b>SOP 9, Sec. 8.1</b>	Did all personnel attending the morning safety/operational briefing sign-in?				(P), (I), (F)
3	<b>SOP 9, Sec. 8.1</b>	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				(P), (I), (F)
4	<b>SOP 9, Sec. 7.3</b>	Did all recovered MPPEH undergo the three-tiered inspection process?				(P), (I), (F)
5	<b>SOP 9, Sec. 7.3</b>	Did the SUXOS and UXOSO assess all MEC and agree that the risk associated with movement is acceptable or not?				(P), (I), (F)
6	<b>SOP 9, Sec. 7.3</b>	Was the decision to move MEC documented in writing before movement or transporting the items to the storage magazines for temporary storage?				(P), (I), (F)
7	<b>SOP 9, Sec. 7.3</b>	Were MPPEH items further classified as MPPEH or MDAS?				(P), (I), (F)
8	<b>SOP 8, Sec 7.5</b>	Were all MEC and MPPEH items photographed?				(P), (I), (F)
9	<b>SOP 9, Sec. 7.4.7</b>	Did the Demolitions Supervisor conduct and document the demolitions briefing?				(P), (I), (F)
10	<b>SOP 9, Sec. 8.1</b>	Was the EZ established and the TSD for the Project Area observed?				(P), (I), (F)
11	<b>SOP 9, Sec. 7.5.1</b>	Was the demolition sequence observed?				(P), (I), (F)

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CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
12	SOP 9, Sec. 7.5.4	Were donor charges properly prepared?				(P), (I), (F)
13	SOP 9, Sec. 7.5.5	Were post-demolition operations conducted?				(P), (I), (F)

FINDINGS	
Item	Comments

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

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**ATTACHMENT 7.  
BRUNSWICK SITE ACCESS FORM**

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**Attachment 7**

<b>MEC Restricted Site Access Request Form</b>			
<b>All information must be completed and serves as the basis for determining schedule, operations, and logistics regarding visit. If changes to the information listed below are made, without sufficient notice, arrangements to accommodate changes may not be able to be made due to explosives safety issue associated with ongoing work.</b>			
<b>Submit completed form via email or fax to the personnel listed below. Access requests must be submitted 72 hours prior to the planned visit.</b>			
<b>Name</b>	<b>Fax #</b>	<b>Email Address</b>	
<b>Date of request:</b>			
<b>Person requesting access:</b>			
<b>Organization:</b>			
<b>Date for requested visit:</b>			
<b>Duration for requested visit:</b>			
<b>Purpose of Requested Visit:</b>			
<b>Is this visit for audit purposes: Yes/No</b> <i>Please submit detailed agenda and phases of work, areas, and/or activities to be audited for audit visits.</i>			
<b>Name(s) of Visitor</b>		<b>Organization</b>	
<b>Note:</b>			
<b>Approval Granted by:</b>			<b>Date of approval:</b>
<b>Concurrence by:</b>			



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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**EXPLOSIVES ACQUISITION, ACCOUNTABILITY AND TRANSPORTATION**

**SOP 10**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 10  
DESCRIPTION: EXPLOSIVES ACQUISITION, ACCOUNTABILITY AND TRANSPORTATION  
REVISION No.: FINAL  
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PROCEDURE No.: SOP 10

DESCRIPTION: EXPLOSIVES ACQUISITION, ACCOUNTABILITY AND TRANSPORTATION

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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- SITE 12 EOD Area Remedial Investigation Work Plan (WP)
- Accident Prevention Plan (APP)
- Occupational Safety and Health Administration (OSHA), 29 CFR 1910, Occupational Safety and Health Standards
- OSHA, 29 CFR 1926, Construction Standards
- Applicable sections of Environmental Protection Agency (EPA), 40 CFR Parts 260 to 299, Protection of Environment
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation
- Naval Sea Systems Command (NAVSEA). 2011. Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping. OP 5 Vol 1 Rev 7 Ch 11. Jan 15, 2013.
- NAVSEA. 2007. Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives and Related Hazardous Materials. SW020-AF-HBK-010 Rev 6. August 1.
- Navy. 2003. Physical Security Instruction for Conventional Arms, Ammunition and Explosives (AA&E). OPNAV 5530.13C. September 26.
- Department of Defense (DOD) 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards
- TM 9-1300-214, Military Explosives
- TM 60 Series Publications
- Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Publication 5400.7. 2012. Federal Explosives Law and Regulation, April
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers, Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual

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### **3. ACRONYMS AND ABBREVIATIONS**

AA&E	Arms, Ammunition and Explosives
APP	Accident Prevention Plan
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
B/L	Bill of Lading
CFR	Code of Federal Regulations
DOD	Department of Defense
EM	Engineer Manual
EPA	Environmental Protection Agency
ft	foot, feet
HBK	Handbook
IME	Institute of Makers of Explosives
in	inch, inches
lb	pound, pounds
MEC	Munitions and Explosives of Concern
NAVSEA	Naval Sea Systems Command
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
PO	Purchase Order
PPE	personal protective equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
SOP	Standard Operating Procedures
SHSP	Site Health and Safety Plan
SUXOS	Senior UXO Supervisor
USA	USA Environmental, Inc
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOTIII	UXO Technician III
WP	Work Plan

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**ATTACHMENT 1. EXPLOSIVE VEHICLE INSPECTION: ON-SITE CHECKLIST**

**ATTACHMENT 2. QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct explosives acquisition, accountability and transportation during the munitions and explosives and concern (MEC) operations at Site 12 EOD Area, former Naval Air Station (NAS), Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the project area and will be used to direct explosives storage and transportation operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:

  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

27 Sep 2013  
\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.



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## **7. PROCEDURES**

### **7.1 PURPOSE**

The purpose of this SOP is to provide USA employees with the minimum procedures and safety and health requirements applicable to the acquisition, accountability, and transportation of explosives during operations at the project area.

### **7.2 SCOPE**

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in the acquisition, transportation and accountability of explosives. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Accident Prevention Plan (APP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

## **7.3 PROCEDURES**

### **7.3.1 Acquisition and Accountability**

USA maintains a valid ATF manufacturer's license/permit, which allows USA to purchase, store and use explosives. USA documents in writing those employees holding current ATF employee possessor clearance that are authorized to receipt for explosives shipments (see Figure 1, Explosives Purchase/Receipt Authorization List). Copies of the USA manufacturer's license and the receipt authorization list are on file for the duration of the project.

#### **7.3.1.1 Explosives Receipt**

Only those individuals named on the authorization list may sign for explosives from the shipper. In order to ensure that the quantity shipped is the same as the quantity listed on the shipping documents, the Senior UXO Supervisor (SUXOS) or his designee and the UXO Quality Control Specialist (UXOQCS) will inventory the shipment prior to signing for it.

#### **7.3.1.2 Shipping Documents**

Explosive shipments generally are accompanied by the explosive suppliers Bill of Lading (B/L) and the freight company's shipping document. The initial inventory will include reconciling the two documents with the actual shipment and creating an on-site record that includes these documents and the inventory records. Regardless of the outcome of the initial inventory, one copy of the B/L and the freight company's shipping document will be attached to a copy of the Purchase Order (PO) request and the PO. One copy of each of the four documents will be kept on file, on-site, and one complete set will be forwarded to the Corporate Office.

#### **7.3.1.3 Receipt Discrepancies**

In the event that there is a discrepancy between the amount shipped and the amount received, the SUXOS will immediately contact the explosive supplier and inform the supplier of the discrepancy. It is then the responsibility of the supplier and shipper to rectify the situation and inform USA of the results. The supplier and/or shipper must then correct their documents and forward the corrected documents to the site. In all cases, only the amount received will be entered on the Explosives Usage Record.

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## **USA Environmental, Inc.**

### List of Persons Authorized to Accept Delivery of Explosives

Name: USA Environmental, Inc. Address: 720 Brooker Creek Blvd, Ste# 204  
License No: 1-FL-103-20-4J-00784 Oldsmar, FL 34677  
Expires: 9/1/2014

By my signature below, I certify that the persons listed below are authorized by me to accept delivery of, possess and use explosives on behalf of USA Environmental, Inc.:

James Walden  
Print Name

Quality Manager, Responsible Person  
Job Title

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date Signed

**Intended Use Statement:** Unexploded ordnance detonation.

List of names (last name, first name, mi):

TBD

TBD

TBD

No further names.

720 BROOKER CREEK BLVD, SUITE #204, OLDSMAR, FL 34677 TEL.: (813) 343-6336 FAX: (813) 343-6337

**Figure 7-1: Explosives Authorization**

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- Initiating explosives, such as blasting caps, will remain separated from other explosives at all times. Blasting caps may be transported in the same vehicle so long as they are in a separate Institute of Makers of Explosives (IME)-22 container (49 CFR 173.63) and secured away from other items.
- Compatibility requirements will be observed.
- Only UXO Technicians III (UXOTIII) and above may be issued with and may transport explosive materials. The receiving party will sign the receipt documents for accountability (the SUXOS is responsible for maintaining the explosives inventory).
- Operators transporting Hazard Division (49 CFR 173.50) 1.1 explosives will have completed the explosives drivers training, met the medical and physical requirements and be subjected to random drug testing as required by NAVSEA SW020-AF-HBK-010.

- Drivers will have a valid driver's license and comply with posted speed limits but will not exceed a safe and reasonable speed for road conditions. Vehicles transporting explosives off-road will not exceed 25 miles per hour and will be properly equipped (Section 8.1).
- Personnel will not ride in the cargo compartment with explosives or MEC.

#### **7.3.2.1 Explosive Transportation Vehicle Requirements**

Explosives will be transported in closed vehicles whenever possible. The load will be well braced and, except when in closed vehicles, covered with a fire-resistant tarpaulin, or will be in an appropriate shipping container (IME-22).

- If the vehicle designated for transporting explosives is a rental vehicle, a written acknowledgement from the lease vehicle carrier regarding transporting explosives will be obtained and kept on file before vehicles can be used to transport explosives.
- Vehicles transporting explosives or MEC will be inspected daily using the Explosive Vehicle Inspection Checklist: On-site, see Attachment 1, (for transportation over public roads, use DD Form 626 to inspect vehicles), and will be properly placarded.
- Vehicle engine will not be running when loading/unloading explosives.
- Explosive-loaded vehicle wheels will be chocked when parked.
- Vehicles transporting explosives will have a first aid kit, two 10: BC rated fire extinguishers, and communications.
- Initiating explosives, such as blasting caps, will remain separated from other explosive materials at all times.
- Compatibility requirements will be observed.

#### **7.4 QUALITY CONTROL**

The Explosives Storage and Transportation operations will meet the quality control (QC) metrics listed on the QC Surveillance check sheet (Attachment 2).

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet, Attachment 2. Any tasks the QC team determines do not meet the quality control metrics will be considered deficient or non-conforming. If the deficiency or nonconformance cannot be resolved immediately, the UXOQCS will prepare a nonconformance report and submit to the SUXOS. The UXOQCS will conduct an analysis of the cause of the deficiency or nonconformance and will prepare and submit a response to the Project Quality Control Manager and the Project Manager within 48 hours.

#### **8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF**

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the Explosives Storage and Transportation tasks along with methods to mitigate the hazards.

**Table 1: Hazard Analysis Matrix**

<b>Activity</b>	<b>Hazard</b>	<b>Triggering Events</b>	<b>Initial Risk Index</b>	<b>Hazard Mitigation</b>	<b>Final Risk Index</b>
Explosives, Storage and Transportation	Slips, Trips or Falls	Climbing into and out of the vehicle cargo area.	C/III/4	Personnel will assess their footing and hand holds at all times. Personnel will never jump from a vehicle.	D/IV/5
	Biological	Biting/stinging insects, spiders, rodents and hazardous plants.	C/III/4	Avoid biological hazards. Wear long sleeve garments and apply repellent to clothing and exposed skin as needed. Use barrier cream as, necessary.	D/IV/5
	Donor Explosives	Donor explosives react to impact, heat, shock and friction.	C/II/3	Vehicles designated to transport explosives will be inspected and any deficiency corrected before the vehicle is used. Properly block and brace donor charges in the cargo area of the vehicle. Store detonators separately from donor charges in an IME-22 when transporting, and in the sited detonator magazine. Personnel handling explosives will wear cotton clothing.	D/III/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

**8.1 HAZARD CONTROL BRIEF**

Explosives drivers will observe posted speed limit signs and drive no faster than the road or weather conditions dictate.

Explosives will be loaded by hand. Personnel will wear cotton clothing when handling explosives. Wear long sleeve (cotton) clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects.



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Personnel will inspect the vehicle using the checklist (Attachment 1) and correct any deficiencies prior to using the vehicle to transport explosives..

In the event of severe weather, account for all team personnel. Contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Health and Safety Health Plan (SHSP).

## **9. DIAGRAMS**

The site map is located in Appendix A of the Work Plan. Teams will be provided maps of the overall project site and evacuation routes.

## **10. EQUIPMENT**

The UXO technician conducting explosives storage and transportation services will be equipped with the following:

- Communications equipment
- Vehicle with wheel chocks and tarpaulin
- Blocking and bracing materials
- Explosives placards as needed
- IME-22 container
- ATF-approved day box for moving detonators to demolition events
- ATF Type II magazines

Safety equipment required includes the following:

- 10 B : C or larger fire extinguishers on the truck
- First-aid kit
- Level D personal protective equipment (PPE)
- Inclement weather gear, as needed

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SHSP, Section 10.2 will be followed. A copy of the SHSP is maintained in all project site vehicles.

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**ATTACHMENT 1.**  
**EXPLOSIVE VEHICLE INSPECTION: ON-SITE CHECKLIST**

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MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)												
(Read Instructions before completing this form.)												
<b>This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.</b>						1. GOVERNMENT BILL OF LADING/TRANSPORTATION CONTROL NUMBER						
SECTION 1 - DOCUMENTATION				ORIGIN a.				DESTINATION b.				
2. CARRIER/GOVERNMENT ORGANIZATION												
3. DATE/TIME OF INSPECTION												
4. LOCATION OF INSPECTION												
5. OPERATOR(S) NAME(S)												
6. OPERATOR(S) LICENSE NUMBER(S)												
7. MEDICAL EXAMINER'S CERTIFICATE*												
8. (X if satisfactory at origin)								9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*				
a. MILITARY HAZMAT ENDORSEMENT				d. ERG OR EQUIVALENT COMMERCIAL:		YES		NO				
b. VALID LEASE*				e. DRIVER'S VEHICLE INSPECTION REPORT*				a. TRUCK/TRACTOR		YES NO		
c. ROUTE PLAN				f. COPY OF 49 CFR PART 397				b. TRAILER		YES NO		
SECTION 11 - MECHANICAL INSPECTION												
All items shag be checked on empty equipment prior to loading. Items with an asterisk shag be checked on all incoming loaded equipment.												
10. TYPE OF VEHICLE(S)						11. VEHICLE NUMBER(S)						
12. PART INSPECTED (X as applicable)		ORIGIN (1)		DESTINATION (2)				ORIGIN (1)		DESTINATION (2)		COMMENTS (3)
		SAT	UNSAT	SAT	UNSAT			SAT	UNSAT	SAT	UNSAT	
a. SPARE ELECTRICAL FUSES						k. EXHAUST SYSTEM						
b. HORN OPERATIVE						l. BRAKE SYSTEM*						
c. STEERING SYSTEM						m. SUSPENSION						
d. WINDSHIELD/WIPERS						n. COUPLING DEVICES						
e. MIRRORS						o. CARGO SPACE						
f. WARNING EQUIPMENT						p. LANDING GEAR*						
g. FIRE EXTINGUISHER*						q. TIRES, WHEELS, RIMS						
h. ELECTRICAL WIRING						r. TAILGATE/DOORS*						
i. LIGHTS AND REFLECTORS						s. TARPULIN*						
j. FUEL SYSTEM*						t. OTHER (Specify)						
13. INSPECTION RESULTS (X one) ACCEPTED						REJECTED						
(If rejected give reason under "Remarks ". Equipment will be approved if deficiencies are corrected prior to loading.)												
14. SATELLITE MOTOR SURVEILLANCE SYSTEM: (X one) ACCEPTED						REJECTED						
15. REMARKS												
16. INSPECTOR SIGNATURE (Origin)						17. INSPECTOR SIGNATURE (Destination)						
SECTION III - POST LOADING INSPECTION												
This section applies to Commercial and Govern ment/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.								ORIGIN (1)		DESTINATION (2)		COMMENTS (3)
								SAT	UNSAT	SAT	UNSAT	
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CIFIR												
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT												
20. SEALS APPLIED TO CLOSED VEHICLE; TARPULIN APPLIED ON OPEN EQUIPMENT												
21. PROPER PLACARDS APPLIED												
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS												
23. COPY OF DID FORM 626 FOR DRIVER												
24. SHIPPED UNDER DOT EXEMPTION 868												
25. INSPECTOR SIGNATURE (Origin)						26. DRIVER(S) SIGNATURE (Origin)						
27. INSPECTOR SIGNATURE (Destination)						28. DRIVER(S) SIGNATURE (Destination)						

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**ATTACHMENT 2.**  
**QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE  
N62470-11-D-8007 CTO WE01  
EXPLOSIVES STORAGE AND TRANSPORTATION**

TEAM INFORMATION		
Team:	Location:	Date:
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	SOP 10 Workers' Statement	Have all personnel assigned to store or transport explosives read this SOP?				(P)
2	SOP 10, Workers' Statement & Sec. 7.3.2	Are all personnel assigned to store or transport explosives qualified to perform their duties?				(P), (I), (F)
3	SOP 10, Sec. 7.3.1	Were the requisitioned donor charges received and accounted for?				(P)
3	SOP 10, Sec. 7.3.2	Do all explosives drivers possess a current medical certificate to transport explosives?				(P), (I), (F)
4	SOP 10, Sec. 7.3.2.1	Is there a written acknowledgement from the lease vehicle carrier to transport explosives on file?				(P), (I), (F)
5	SOP 10, Sec. 7.3.2.1	Are vehicles inspected using the checklist in Attachment 1 prior to loading explosives?				(P), (I), (F)
6	SOP 10, Sec. 7.3.2.1	Were the wheels of vehicle chocked before loading explosives?				(P), (I), (F)
7	SOP 10, Sec. 7.3.2	Are detonators transported in an IME-22 container?				(P), (I), (F)

FINDINGS	
Item	Comments

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_



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**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**MEC ANALOG DETECTION AND REMOVAL**

**SOP 11**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 11  
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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Site 12 EOD Area Remedial Investigation Work Plan (WP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual
- NAVSEA OP 5, Volume 1, Seventh Revision, Ashore

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### 3. ACRONYMS AND ABBREVIATIONS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
BSI	Blind Seed Item(s)
DGM	Digital Geophysical Mapping
DU	Decision Unit
EM	Engineer Manual
ESQD	Explosive Safety Quantity Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
GSV	Geophysical System Verification
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MGFD	Munitions with the Greatest Fragmentation Distance
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site(s)
NOSSA	Naval Ordnance Safety and Security Activity
OPNAVINST	Naval Operations Instruction
PDA	Personal Digital Assistant
PPE	personal protective equipment
SOP	Standard Operating Procedure
SHSP	Site Health and Safety Plan
TL	Team Leader(s)
TSD	Team Separation Distance
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WP	Work Plan

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**ATTACHMENT 1. MEC DAILY ACTIVITIES CHECKLIST**

**ATTACHMENT 2. MANUAL GRID RECORD**

**ATTACHMENT 3. QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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**4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL**


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) Unexploded Ordnance (UXO)-qualified personnel to conduct analog detection and removal of munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH), during the investigation at Site 12 EOD Area, Former Naval Air Station Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the project area and will be used to direct detection and removal operations.

Developed by:

  
\_\_\_\_\_  
James Walden  
Project Quality Control Manager

9/23/2013  
\_\_\_\_\_  
Date

Reviewed by:


  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer  
(Signature to be provided in Final SOP)

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA Environmental, Inc.,  
ou=Safety and Quality, email=rcrownover@usatampa.com,  
c=US  
Date: 2013.09.25 17:13:10 -0400

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Date

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

[illegible]

PROCEDURE No.: SOP 11  
DESCRIPTION: MEC ANALOG DETECTION & REMOVAL  
REVISION No.: FINAL  
DATE: SEPTEMBER 2013  
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## **7. PROCEDURES**

### **7.1 PURPOSE**

The purpose of this SOP is to provide USA employees and subcontractors with the minimum procedures and safety and health requirements applicable to conducting and observing MEC analog detection and removal during operations within the project area.

### **7.2 SCOPE**

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in conducting and adhering to MEC analog detection and removal procedures. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the APP, applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 2 of this SOP for additional compliance issues.

The primary investigative procedure for the Northern Munitions Response Sites (MRS) is reacquisition and intrusive investigation of Digital Geophysical Mapping (DGM) anomalies. However, there may be occasion for analog detection and removal within areas determined for step-out investigation by the project team or DGM inaccessible areas.

### **7.3 DAILY OPERATIONAL BRIEFINGS**

At the beginning of each work day, the Senior Unexploded Ordnance Supervisor (SUXOS) or his/her designee will hold a briefing in accordance with the requirements of the approved work plan (WP). At a minimum, this briefing will include the following:

- Work assignments
- Site Specific Explosive Safety Quantity Distance (ESQD)
- Team separation distances (TSD)
- Entry and control points
- Review of emergency procedures
- Review of ordnance safety
- Review of communications procedures and equipment
- Review of any site-specific hazards and the measures that will be used to mitigate those hazards
- Review of environmental concerns
- Procedures for coordination of intrusive investigation work with personnel performing non-MEC activities.

Other issues will be discussed during the briefing as necessary to support safe and efficient operations. The SUXOS will document the daily briefing in his/her logbook and will obtain the signatures of those attending the briefing on a daily briefing attendance sheet. During the daily briefing, the SUXOS will also assign work sites to each of the UXO teams for intrusive operations. Each team will receive a map and a dig package containing the necessary information to perform the assigned work. The SUXOS will complete the top portion of the MEC Daily Activities Checklist (Attachment 1) and transfer it to the UXO Team Leaders (TL). The top portion of this checklist verifies that the TL has received the necessary information to support daily activities, including a complete dig package, information on utilities that may be present in the work area and daily briefing and safety information. They will brief their teams on potential hazards in the area where they will be working and document the briefing on the MEC Daily Activities Checklist, as well as on the Tailgate Safety Briefing Form in the APP. Work assignments,

equipment inspections, and other routine daily activities will be documented on the MEC Daily Activities Checklist as well.

## **7.4 GENERAL REQUIREMENTS FOR ANALOG DETECTION AND REMOVAL OPERATIONS**

### **7.4.1 ANALOG DETECTION AND REMOVAL ACTIONS**

All analog detection and removal (mag and dig) activities at MEC sites will be under the supervision of UXO qualified personnel. Non-UXO qualified personnel will not be allowed in the Exclusion Zone (EZ) during intrusive operations. If access is required by non-UXO qualified personnel, all work will stop while they are in the EZ. During operations, USA personnel will strictly adhere to the Site Health and Safety Plan (SHSP) and the following general safety practices:

- Each intrusive investigation team will typically be composed of five members: a TL and four UXO Technicians II/I (UXOTII/I).
- Intrusive investigation activities will not be conducted until the required training (both general and site-specific) and proper equipment/vehicle checks have been completed.
- Intrusive investigation operations will not be initiated until an appropriate EZ is established based upon the munitions with the greatest fragmentation distance (MGFD) in accordance with the approved Explosives Safety Submission (ESS).
- All personnel will attend the daily safety briefing (tailgate safety briefing) prior to entering the operating area.
- Operations will be conducted during daylight hours only.
- Access to operating areas will be limited to only those personnel necessary to accomplish the specific operation.
- Proper function of all analog detectors and their operators will be verified at the Instrument Verification Strip (IVS) at the beginning of each day and again at the mid-day break.
- During UXO operations the minimum separation distance (MSD) between UXO and non-UXO operations is the fragmentation distance of the MGFD, as stated in the Work Plan.
- UXO will be handled only by qualified UXO Technicians.
- The SUXOS will be notified of all MEC finds.
- Anyone can stop operations for an unsafe act or situation.
- Safety violations and/or unsafe acts will be immediately reported to the UXOSO.
- Failure to comply with safety rules/procedures may result in termination of employment.

### **7.4.2 Grid Layout**

The project area is bounded by land use control fencing. Therefore a survey of the boundary is not required. However, unless it is already surveyed and staked, a registered land surveyor will survey the boundary of DU-2, which is not included in this RI. Grids for geophysical investigation activities are established by UXO personnel experienced in navigation using hand-held Global Positioning System (GPS) devices or by using a tape measure and a compass. MEC avoidance in accordance with SOP 01 will be conducted, including checking the intended survey stake locations with a hand-held detector prior to driving stakes into the ground. This will prevent driving stakes into buried MEC.

### **7.4.3 Analog Clearance Procedures**

Analog detector sweeps (i.e., mag and dig) are particularly effective in areas where vegetation and terrain limit the use of larger digital systems. Also, mag and dig approaches should be used when there is insufficient difference between MEC at the site and other metallic fragments and debris, such that digital discrimination is ineffective or cost prohibitive.

Initially, individual search lanes will be established at approximately 5 feet (ft) wide. Each lane will be surveyed using a hand-held all-metals detector, such as a Whites DFX 300 or MineLab. The operation will begin at one end of each lane and move in a forward direction toward the opposing baseline. During the forward movement the technician moves the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer are performed at a pace that ensures the entire lane is searched and that the instrument is able to appropriately respond to subsurface anomalies. When a subsurface anomaly or metallic surface object is encountered, the UXO Technician halts and investigates the anomaly at that time. Throughout this operation the TL closely monitors the team's individual performance to ensure these procedures are being performed correctly.

### **7.5 SURFACE MEC AND MPPEH**

All metallic surface items detected visually or with instrument assistance are to be removed. Upon encountering a surface MEC or MPPEH item, it will be identified by two UXO Technicians prior to determining if the item is safe or not safe to move. All MEC and MPPEH are to be inspected and managed in accordance with the ESS and WP (SOP 08 MPPEH Management and SOP 09 MEC Management and Disposal).

### **7.6 SUBSURFACE ANOMALIES**

#### **7.6.1 Manual Excavations**

Subsurface anomalies will be investigated by UXO-qualified personnel as they are identified during the sweep. All identified anomalies within the grid will be intrusively investigated. Excavations for individual anomalies will be conducted using an all-metals detector to assist the team in determining the location and orientation of the target item. The UXO Technicians excavating anomalies will initially remove no more than a 6-inch layer of soil alongside the location of the anomaly, being careful not to impact the anomalous feature. The UXO Technician will conduct a visual and electronic search of the excavation to further pinpoint the anomaly source as needed. This process will be repeated until the audible signal from the magnetometer indicates the object is close to the surface. Once this determination has been made, soil will be removed by hand until the source of the anomaly is located. Excavations on individual anomalies greater than 4 ft below the ground surface (bgs) will not be made without prior review of the excavation procedure With the UXOSO.

### **7.7 RECORD KEEPING**

The team leader will maintain a field logbook, which at a minimum will contain a record of the following:

- Weather
- Instrument details and serial number
- Team Personnel
- Grids worked
- Start and stop times



- MEC/UXO items encountered
- Blind Seed Items (BSI) recovered.

The data to be recorded for each item discovered during anomaly excavation will include the following (as applicable):

- Type (e.g., MD, MPPEH, UXO, BSI and non-MEC Scrap)
- Description (e.g., “projectile, 20-mm, practice, MK105” and “base, coupling, firing device”)
- Initial Condition (e.g., expended, inert, live, and to be determined [TBD])
- Approximate length
- Approximate width
- Depth
- Approximate weight
- Found in a pit?
- Piece of frag?
- Initial disposition (e.g., left in place and removed to scrap pile)
- Requires demolition?

All MEC/MDEH will be photographed with a whiteboard backdrop inscribed with the descriptive information listed above along with the grid identifier.

The Manual Grid Record Form (Attachment 2) is to be completed by the TL. Topographical or other interfering features, such as: rock outcroppings, fence-lines, structures or deadfalls that mask the ground will be indicated.

All data will be turned into the SUXOS at the end of the day.

## **7.8 MEC & MPPEH DISPOSITION**

All MEC and MPPEH are to be inspected and managed for final disposition, in accordance with the ESS and WP (SOP 08 MPPEH Management and SOP 09 MEC Management and Disposal). MEC that is fused or otherwise determined unsafe to move will be blown in place (BIP). MEC items deemed safe to move will be relocated to the designated consolidation area or temporary storage magazine.

## **7.9 WORK CLOTHING AND FIELD SANITATION**

Work clothing will be appropriate for the conditions encountered. In most cases, this will be Level D personal protective equipment (PPE), which includes the following.

- Short- or long-sleeved cotton coveralls or work clothing will be worn.
- Footwear is sturdy work boots or rubber boots as appropriate (i.e., lug sole and of sufficient height for ankle support). UXO personnel will not wear steel-toe safety boots when using metal detectors.
- Safety glasses.
- Inclement weather gear as required.

The team will be outfitted with field decontamination equipment, which will consist of containers of water, paper towels, and soap. Good housekeeping and decontamination measures will be practiced.

#### **7.10 QUALITY CONTROL**

The Intrusive Investigation teams will meet the quality control (QC) metrics listed on the QC Surveillance check sheet (Attachment 3).

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any grid investigations the QC team determines do not meet the quality control metrics will be considered deficient or non-conforming. If the deficiency or nonconformance cannot be resolved immediately, the UXOQCS will prepare a nonconformance report and submit to the SUXOS. The UXOQCS will conduct an analysis of the cause of the deficiency or nonconformance and prepare and submit a response to the Project Quality Control Manager and the Project Manager within 48 hours.

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## 8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (refer to Table 1) lists the existing and potential hazards associated with conducting the MEC analog detection and removal tasks along with methods to mitigate the hazards.

**Table 1: Hazard Analysis Matrix**

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
MEC Analog Detect and Dig	Slips, Trips or Falls	Climbing; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times.	D/IV/5
	Hot Weather	Seasonal weather patterns.	C/III/4	Monitor heat stress; provide cool drinking water, work-rest schedule, and cool shelter for breaks. Wear sun screen.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear. Keep feet dry (carry extra socks). Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects, spiders, rodents and hazardous plants.	C/III/4	Avoid biological hazards. Wear long sleeve garments and apply repellent to clothing and exposed skin as needed. Use barrier cream as, necessary.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Maintain the team separation distance between teams for the Project Area (see the hazard control briefing that follows). All personnel will receive a safety briefing prior to commencing site activities A UXO-qualified person will escort all non-UXO-qualified personnel and will	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
				strictly adhere to the directions of the UXO-qualified escort. A UXO-qualified person will locate an anomalous-free area with the metal detector prior to placing grid corner stakes or other markers.	
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

## 8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the TL on the existing and potential hazards prior to commencing any activities in the project area. The Activity Hazard Analysis (AHA), in Appendix A of the APP (for the activities the team will perform), will be reviewed and signed by all team personnel.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the terrain. All personnel will be aware of the signs of heat stress/cold stress as described in Section 9.14 of the APP and be able to recognize the onset of heat and cold stress disorders in themselves and their team members.

Wear long sleeve clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects.

The potential for encountering MPPEH is moderate. Maintain the TSD as follows:

- 23-ft based on the K40 distance for the 40-mm Mk2 projectile, (primary)
- 50-ft based on the K40 distance for the 90-mm M71 projectile, (contingency)

If a munitions item with larger fragmentation distance is encountered, the work will stop for a modification to the ESS.

In the event of severe weather or a natural disaster, account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the SHSP.

## 9. DIAGRAMS

The site map is located in Appendix A of the WP. Teams will be provided maps of the overall project site and evacuation routes.

## **10. EQUIPMENT**

The UXO technician providing MEC analog detection and removal will be equipped with the following:

- Handheld all-metals detector
- Shovel and/or other hand tool for digging
- Plastic 5-gal Bucket
- Red pin flags for marking suspected MEC items
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

Safety equipment required includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SHSP, Section 10.2, will be followed. A copy of the SHSP is maintained in all project site vehicles.


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**ATTACHMENT 1.**  
**MEC DAILY ACTIVITIES CHECKLIST**

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	<h2 style="margin: 0;">MEC DAILY ACTIVITIES CHECKLIST</h2>
<b>Project Information</b>	
Project Name: _____	Date: _____
Project Location: _____	Team No. _____
Work Area: _____	
<b>SUXOS Checklist items</b>	
Name: _____	
<i>Check Items Complete</i>	
<input type="checkbox"/>	Conduct daily briefing (safety, emergency procedures, munitions information, etc.).
<input type="checkbox"/>	Notify team leader of utilities or other dangers. _____
<input type="checkbox"/>	Assign work area and provide data package.
<b>UXO Team Leader Checklist Items</b>	
Name: _____	
<i>Check Items Complete</i>	
<input type="checkbox"/>	Ensure that all necessary data have been provided by the SUXOS for daily operations.
<input type="checkbox"/>	Conduct vehicle inspection.
<input type="checkbox"/>	Conduct tailgate safety briefing.
<input type="checkbox"/>	Perform equipment inspections and operational tests (record in log book).
<input type="checkbox"/>	Verify daily heavy equipment inspection.
<input type="checkbox"/>	Identify known utilities.
<input type="checkbox"/>	Ensure that work area is secure as required (road closures, exclusion zone set up, etc.).
<input type="checkbox"/>	Notify site office of start time for ordnance operations.
<input type="checkbox"/>	Ensure that all required data have been recorded (data sheets, log books, photo log, etc.).
<input type="checkbox"/>	Ensure that site restoration required is complete.
<input type="checkbox"/>	Notify site office of stop time for ordnance operations.
<b>Approvals</b>	
SUXOS Signature: _____	Date: _____
Team Leader Signature: _____	Date: _____



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**ATTACHMENT 2.  
MANUAL GRID RECORD**


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**USA Environmental, Inc.**

## MANUAL GRID RECORD

Date:	Project:	Grid Number:	
Supervisor Name:		Type of Operation:	
Sensor Used:		Number of Personnel:	
Start Time:	: <input type="checkbox"/> AM <input type="checkbox"/> PM	# Anomalies:	
Stop Time	: <input type="checkbox"/> AM <input type="checkbox"/> PM	# MEC:	



 SW Corner of Grid

# Digs \_\_\_\_\_ lbs MD \_\_\_\_\_ lbs scrap \_\_\_\_\_

Remarks:

TL/Supervisor Signature: \_\_\_\_\_

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**ATTACHMENT 3.**  
**QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE**  
**Site 12 EOD Area**  
**N62470-11-D-8007 CTO WE01**  
**INTRUSIVE INVESTIGATION**

TEAM INFORMATION		
Team:	Location:	Date:
Team Leader:		
Personnel Present:		
Phase of Inspection (Circle): <i>Preparatory (P); Initial (I); Follow-Up (F)</i>		

CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
1	SOP 11, Sec. 6 Workers' Statement	Have all Intrusive Investigation Team Members read this SOP?				(P)
2	SOP 11, Sec. 7.3	Did all personnel attending the morning safety/operational briefing sign-in?				(P), (I), (F)
3	SOP 11, Sec. 7.3	Did the Team Leader conduct and document the Tailgate Safety Briefing prior to beginning operations?				(P), (I), (F)
4	SOP 11, Sec. 7.4.1 and 8.1	Was the EZ established and the TSD for the Project area observed?				(P), (I), (F)
5	SOP 11, Sec. 7.4.1	Were all instruments tested by the UXO personnel to whom they are assigned at the IVS?				(P), (I), (F)
6	SOP 11, Sec. 7.4.2	Are grid corners (or MRS boundaries) properly located and marked, and left in place?				(P), (I), (F)
7	SOP 11, Sec. 7.4.3	Are instrument sweeps of the search lanes performed to ensure full coverage of each lane?				(P), (I), (F)
8	SOP 11, Sec. 7.6 Hazard Analysis Matrix	Are team members using excavation techniques to mitigate hazards?				(P), (I), (F)
9	SOP 11, Sec. 7.7	Were dig sheets filled out correctly, using standardized nomenclature for MEC and MDEH?				(P), (I), (F)
10	SOP 11, sec 7.7	Were all MEC and MDEH items photographed?				(P), (I), (F)



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CHECKLIST						
ITEM	REF.	INSPECTION POINT	YES	NO	N/A	COMMENTS
11	SOP 11,	Were all blind seed items recovered and correctly documented? Note: not all BSIs placed for DGM, or analog and flagging of DGM inaccessible areas, will be selected and included on the dig list for investigation.				(P), (I), (F)

FINDINGS	
Item	Comments

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

**1. TITLE PAGE**

FINAL

STANDARD OPERATING PROCEDURE

FOR

**DGM TARGET REACQUISITION**

**(SURVEY LOCATION STAKEOUT AND MEASUREMENT)**

**SOP 12**

MEC REMEDIAL INVESTIGATION

SITE 12 EOD AREA

FORMER NAVAL AIR STATION BRUNSWICK  
BRUNSWICK, MAINE

USA ENVIRONMENTAL, INC.

September 2013

PROCEDURE No.: SOP 12  
DESCRIPTION: TARGET REACQUISITION  
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PROCEDURE No.: SOP 12  
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## 2. REFERENCES

- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11B
- Munitions and Explosives of Concern Quality Assurance Project Plan (MEC QAPP)
- Accident Prevention Plan (APP)
- Geophysical System Verification (GSV) Plan
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39C.

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### **3. ACRONYMS AND ABBREVIATIONS**

APP	Accident Prevention Plan
DGM	Digital Geophysical Mapping
DGPS	Differential Global Positioning System
EPP	Environmental Protection Plan
ESS	Explosives Safety Submission
ID	Identification
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
NAVFAC MIDLANT	Naval Facilities Engineering Command Mid Atlantic
PDA	Personal Digital Assistant
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure
SHSP	Site Health and Safety Plan
TSD	Team Separation Distance
USA	USA Environmental, Inc.
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist

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**ATTACHMENT 1: QUALITY CONTROL SURVEILLANCE CHECK SHEET**



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#### 4. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL


This standard operating procedure (SOP) contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) field staff to conduct consistent reacquisition of targets for excavation during the MEC activities at the Site 12 EOD Area, Former Naval Air Station Brunswick, Maine. By their signatures, the undersigned certify that this SOP is approved for implementation at the work area and will be used to direct target reacquisition. The Site Geophysicist, in collaboration with the field QC staff, is responsible for the maintenance of this procedure. Approval authority rests with the Project Geophysicist and Project Quality Control Manager (PQCM).

Developed by:

  
\_\_\_\_\_  
Al Crandall  
Project Geophysicist

9/25/2013  
\_\_\_\_\_  
Date

Reviewed by:

  
\_\_\_\_\_  
Robert Hierholzer  
Project Manager

9/23/2013  
\_\_\_\_\_  
Date

Validated by:

\_\_\_\_\_  
Charles Bobo  
UXO Safety Officer

\_\_\_\_\_  
Date

Approved by:

  
\_\_\_\_\_  
Robert Crownover  
Director of Safety and Quality

Digitally signed by Robert D. Crownover  
DN: cn=Robert D. Crownover, o=USA  
Environmental, Inc., ou=Safety and Quality,  
email=rcrownover@usatampa.com, c=US  
Date: 2013.09.25 17:13:45 -04'00'

\_\_\_\_\_  
Date

This standard operating procedure (SOP) expires at the conclusion of project activities and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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## 5. SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the activities described in this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the worker's statement for this purpose. I will ensure the SOP contains current procedures. If a major change to the SOP is necessary, I will ensure that the process is stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been eliminated.

Brian Thompson  
Senior UXO Supervisor

Date

## 6. WORKER'S STATEMENT

I have read this SOP and I have received adequate training to perform the procedures addressed in the SOP. If I identify a hazard not addressed in the SOP, or encounter an operation I cannot perform in accordance with the SOP, I will stop the process and notify my immediate supervisor.

[illegible]

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## **7. PROCEDURES**

### **7.1 PURPOSE**

The purpose of this SOP is to provide procedures for the consistent reacquisition (survey location stakeout and measurement) of targets for excavation during the Munitions and Explosives of Concern (MEC) activities at the project area.

Target reacquisition procedures will be conducted in accordance with the Quality Assurance Project Plan (QAPP), the Site Health and Safety Plan (SHSP), and the Explosives Safety Submission (ESS).

### **7.2 SCOPE**

This SOP applies to the reacquisition of targets identified from the interpretation of geophysical sensor data. The target positions are derived from final processed data from the real time kinematic differential global positioning system (RTK DGPS) and the EM61-MK2 time domain electromagnetic induction sensor. These guidelines will be used to locate targets identified as potential MEC through interpretation of the geophysical data. The major elements of this SOP are:

- System setup
- Navigation/occupation of desired coordinates (interpreted Digital Geophysical Mapping (DGM) target relocation)
- Information recording
- Demarcation of coordinates
- Quality Control (QC).

The reacquisition team is not refining DGM anomalies as there are sufficient DGM checks (e.g., IVS and BSIs) to document any systematic offset between RTK DGPS and EM61-MK2 data. Refining and clearing anomalies within 2.5 ft (0.762-M) are the responsibilities of the intrusive and QC teams.

Personnel requirements and responsibilities are presented in the MEC (QAPP).

### **7.3 GENERAL PROCEDURES**

The general procedures for DGM target reacquisition consist of system setup, navigation/occupation to desired coordinates, recording coordinate information, demarcation of coordinates, and quality control. Personnel who perform target reacquisition are responsible for understanding these procedures.

#### **7.3.1 System Setup and QC Checks**

Setup procedures for the RTK DGPS can be found in SOP 4, Digital Geophysical Surveying. QC checks includes RTK DGPS reoccupation checks [at least one rover reports known location within 0.328-ft (10-cm)].

#### **7.3.2 Navigation/Occupation of Coordinates (DGM target relocation)**

- Ensure target(s) coordinates from the dig sheet have been uploaded into the RTK DGPS survey controller. Coordinates should be sorted to expedite reacquisition as much as possible.
- Use instrument data and visual aids to interactively navigate to approximate coordinates of the target. For relative or specialized coordinate systems, field personnel must understand the Cartesian system.

- Place RTK DGPS over interpreted location (within 0.5 ft (15 cm)); record these coordinates and add any comments.
- Mark the *interpreted* location using a pin flag or other means of temporarily identifying the location, following anomaly avoidance procedures.

### 7.3.3 Recording of Reacquisition Information

- Record all information for the reacquired location(s) either manually or on the field-ready personal digital assistant (PDA), if available, to store the information on the reacquired location(s).
  - Measure each reacquired location with the RTK DGPS to document stakeout accuracy
  - Add any reacquisition comment [e.g. source identified, terrain feature (e.g., bump)]
- Mark the target location with a non-metallic pin flag or other approved means.
- Ensure that the marker (i.e., pin flag) is pushed into the ground at least 3 to 4 in (7.6 to 10.2 cm). On hard surfaces, use another pre-approved method.
- Ensure that the target identification (ID) number from the database is written on the pin flag. Each marked location requires a UNIQUE number.
- Continue to the next target location.
- Update dig sheet with reacquisition results.

## 7.4 QUALITY CONTROL

The Target Reacquisition teams will meet the QC metrics listed on the attached QC Surveillance check sheet.

The QC team will verify the quality of the task through the three-phased surveillance process and document the results on the check sheet. Any reacquired targets the QC team determines do not meet the quality control metrics will be considered deficient or non-conforming. If a deficiency or nonconformance occurs, the UXO Quality Control Specialist (UXOQCS) will prepare a Deficiency Notice or Nonconformance Report and submit to Senior UXO Supervisor (SUXOS) and Quality Assurance (QA). QA will conduct a root cause analysis of the deficiency or nonconformance, and prepare and submit a response to the Navy Technical Representative within 48 hours.

## 8. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting the target reacquisition task along with methods to mitigate the hazards.

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**Table 1: Hazard Analysis Matrix**

<b>Activity</b>	<b>Hazard</b>	<b>Triggering Events</b>	<b>Initial Risk Index</b>	<b>Hazard Mitigation</b>	<b>Final Risk Index</b>
Target Reacquisition (Survey location stakeout and measurement)	Slips, Trips or Falls	Climbing; debris, holes or crevasses obstructed from view by vegetation.	C/III/4	Assess surroundings prior to proceeding with field activities. Ensure footing at all times.  Wear leather safety toe work boot with ankle support and non-slip soles	D/IV/5
	Hot Weather	Seasonal weather patterns.	C/III/4	Monitor for heat stress; provide cool drinking water, work-rest schedule, and cool shelter for breaks.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear Keep feet dry (carry extra socks).  Monitor team members for signs of cold stress disorder in accordance with the APP	D/IV/5
	Biological	Biting/stinging insects, spiders, rodents and hazardous plants.	C/III/4	Avoid biological hazards.  Wear long sleeve garments and apply repellent to clothing and exposed skin as needed.  Use barrier cream, as necessary.	D/IV/5
	Sunburn	Work in outdoor environment.	B/IV/4	Use sunscreen and wear a hard hat.	C/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or	C/II/3	Maintain the team separation distance between	D/III/5



Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
		personnel.		<p>teams for the MRSs (see the hazard control briefing that follows)</p> <p>All personnel will receive a safety briefing prior to commencing site activities</p> <p>A UXO-qualified person will escort all non-UXO-qualified personnel and will strictly adhere to the directions of the UXO-qualified escort.</p> <p>UXO-qualified person will locate an anomalous-free area with the metal detector, prior to digging or placing a pin flag into the ground.</p>	
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

## 8.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the Team Leader on the existing and potential hazards within the specific work area prior to commencing any activities in the project area.

Personnel will be cognizant of the surroundings at all times and remain observant of their footing as they traverse the Munitions Response Site (MRS). All personnel will be aware of the signs of heat and cold stress as described in Section 9.14 of the APP and be able to recognize the onset of heat stress disorders in themselves and their team members.

Apply insect repellant as warranted to mitigate the impact of biting/stinging insects.

In the event of severe weather or a natural disaster (blizzard, very high winds, etc.), account for all team personnel, contact the UXO Safety Officer, SUXOS or Site Manager for instructions and follow the Emergency Response Plan in Section 10.2 of the Site Health and Safety Plan (SHSP).

## **9. DIAGRAMS**

A site maps of the investigation area is included in Appendix A of the Work Plan. Teams will be provided maps of the overall project site and evacuation routes.

## **10. EQUIPMENT**

A listing of the components of the positioning systems and other required equipment is provided below.

- Real Time Kinematic Differential Global Positioning System (RTK DGPS): As each independent government contractor may use various RTK DGPS systems, the necessary equipment and setup procedures will vary with each system. The manufacturer's instruction manual should be consulted in these situations. A copy of the manufacturer's manual is available with each RTK DGPS.
- Logbook
- Communication radio (2-way)
- Color-coded sensor map with dig sheet
- Non-metallic white pin flags or other means of demarcation
- Permanent marker (e.g., Sharpie)
- Electrician's tape
- Plastic bags
- Clipboard
- Non-sparking probe to pilot pin flags

The required safety equipment includes the following:

- First-aid kit
- Level D PPE
- Inclement weather gear as needed.

## **11. EMERGENCY RESPONSE PROCEDURES**

In the case of an emergency, the procedures detailed in the SHSP, Section 10.2, will be followed. A copy of the SHSP is maintained in all project site vehicles.

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**ATTACHMENT 1**  
**QUALITY CONTROL SURVEILLANCE CHECK SHEET**

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**PREPARATORY, INITIAL, FOLLOW-UP CHECKLIST AND QC SURVEILLANCE  
SITE 12 EOD AREA**

**N62470-11-D-8007 CTO WE01**

**TARGET REACQUISITION (SURVEY LOCATION STAKEOUT AND MEASUREMENT)**

TEAM INFORMATION		
<b>Team:</b>	<b>Location:</b>	<b>Date:</b>
<b>Team Leader:</b>		
<b>Personnel Present:</b>		
<b>Target List:</b>		
<b>Phase of Inspection (Circle):</b> <i>Preparatory (P); Initial (I); Follow-Up (F)</i>		

CHECKLIST						
Item	Ref.	Inspection Point	Yes	No	N/A	Comments
1	<b>SOP 12 &amp; Workers' Statement</b>	Have all Target Reacquisition Team Members reviewed SOP 12?				(P)
2	<b>QAPP WS#7 &amp; 8</b>	Are all Team Members trained and qualified to operate the equipment?				(P), (I), (F)
3	<b>SOP 12, Sec. 7.3.1</b>	Were the system setup and QC checks for RTK DGPS and White DFX300 performed prior to reacquisition of targets?				(P), (I), (F)
4	<b>SOP 12, Sec. 7.3.2</b>	Was the RTK DGPS placed within 0.5ft (15cm) of the interpreted DGM target location and the coordinates recorded?				(P), (I), (F)
5	<b>SOP 12, Sec. 7.3.3</b>	Was reacquisition information recorded on each pin flag/log book/survey controller (measured stakeout location and reacquisition comments)?				(P), (I), (F)
6	<b>SOP 12, Sec. 7.3.4</b>	Was the DGM target location marked with a non-metallic pin flag pushed 3 to 4in (7.6 to 10.2cm) into the ground?				(P), (I), (F)
7	<b>SOP 12,</b>	Was dig sheet updated with the reacquisition results/comments?				(P), (I), (F)

FINDINGS	
Item	Comments

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FINDINGS	
Item	Comments

Conducted By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

## **APPENDIX C. CONTRACTOR FORMS**

This appendix contains the following project forms for the Site 12 MEC RI:

- Accident/Illness/Near Miss Report
- Contractor Safety Self-Evaluation Checklist (NAVFAC Form)
- Daily Quality Control Log
- Daily Site Report
- DD Form 1348-1A
- Deficiency Notice
- Deficiency Notice Log
- DoD Form 626 Explosives Transportation Vehicle Inspection
- Emergency Notification Information
- Employee Emergency Information
- Explosives Usage Record
- Field Change Request NAVY
- Grid QC Inspection Record
- Grid Record - Manual
- Hazard Assessment Form
- Heat Stress Alert
- Heat Stress Monitoring Log
- MDAS Accumulation Form
- MEC Accountability Log
- Operator & Geophysical Instrument Checkout
- Record of Safety Violation or Non-Compliance
- Safety Inspection Form for MEC Operations
- Safety Inspection Report
- Safety Meeting/Training Record
- Site Visitors Log
- Tailgate Safety Briefing.
- Weekly QC Report

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**ACCIDENT / ILLNESS / NEAR MISS REPORT**

SECTION 1 – GENERAL INFORMATION			
Name: _____		SSN: _____	Log #: _____
D.O.B.: _____	Sex: _____	Age: _____	OSHA Recordable Incident: <input type="checkbox"/> Yes <input type="checkbox"/> No
Job Title: _____			
Date of Report: _____	Date of Incident: _____	Time of Incident: _____	
Task/Operation Being Conducted: _____			
PPE Worn: _____			
SITE CONDITIONS AT TIME OF ACCIDENT / INCIDENT			
Temperature: Direction: Other: _____	Humidity: Cloud Cover: _____	Wind Speed: Precipitation: _____	
Type of Incident:	<input type="checkbox"/> Personal Injury <input type="checkbox"/> Motor Vehicle	<input type="checkbox"/> Personal Illness <input type="checkbox"/> Property Damage	<input type="checkbox"/> Chemical Exposure <input type="checkbox"/> Near Miss
If chemical exposure, what material(s) was(were) involved: _____			
What was the nature of exposure (contact, inhalation, etc.): _____			
Other Individual(s) Involved: _____			
SECTION 2 – PERSONAL INJURY/ILLNESS INFORMATION			
Nature/Type of Injury/Illness (laceration, strain, etc.): _____			
Cause of Injury/Illness: _____			
Body Part(s) Affected: Primary: _____ Secondary: _____			
Injury/Illness Required: <input type="checkbox"/> On Site/Clinic First Aid Treatment <input type="checkbox"/> Emergency Room Treatment <input type="checkbox"/> Hospitalization			
Injury/Illness Resulted In: <input type="checkbox"/> Loss of Work Time <input type="checkbox"/> Limitation of Duties <input type="checkbox"/> Fatality <input type="checkbox"/> Other (Explain): _____			
Status at Time of Report: <input type="checkbox"/> Returned to Work: (Date: _____) <input type="checkbox"/> Hospitalized: (Anticipated Stay: _____) <input type="checkbox"/> Convalescing: (Anticipated Length of Convalescence: _____) <input type="checkbox"/> Other: _____			
On Site First Aid Treatment Given: _____			
Off Site First Aid or Other Medical Treatment (attach documentation, including Physician statement): _____			

**ACCIDENT/ILLNESS/NEAR MISS REPORT (cont.)****SECTION 3 – MOTOR VEHICLE ACCIDENT**

Type of Vehicle/Equipment	Type of Collision	Seat Belt Use
<input type="checkbox"/> Automobile/SUV <input type="checkbox"/> Van/Truck <input type="checkbox"/> MHE/EMM <input type="checkbox"/> Other: _____	<input type="checkbox"/> Side Swipe <input type="checkbox"/> Rear End <input type="checkbox"/> Backing <input type="checkbox"/> Head on <input type="checkbox"/> Broadside <input type="checkbox"/> Roll	Front Seat <input type="checkbox"/> Yes <input type="checkbox"/> No Back Seat <input type="checkbox"/> Yes <input type="checkbox"/> No

**Property/Material/Items Involved**

Name of Item: _____	Owner: _____	Damage Estimate: \$ _____
---------------------	--------------	---------------------------

Accident/Near Miss Description (Use additional paper if needed): \_\_\_\_\_

**SECTION 4 – POST-ACCIDENT/INJURY/ILLNESS REVIEW**Has the Home Office been notified?    ☐ Yes    ☐ No    If Yes, When? \_\_\_\_\_    By Whom? \_\_\_\_\_

Were operations conducted using approved USAE SOP or an APP/ SSHP?

☐ Yes    Reference: \_\_\_\_\_☐ No    Explain: \_\_\_\_\_

SUXOS's Comments: \_\_\_\_\_

Employee Comments: \_\_\_\_\_

**WITNESSES**

Name	Organization	Phone Number
_____	_____	_____

Employee Signature: \_\_\_\_\_ Date: \_\_\_\_\_

SUXOS Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Actions Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Corporate Review by: \_\_\_\_\_ Date: \_\_\_\_\_

**ACCIDENT/ILLNESS/NEAR MISS REPORT (cont.)**

Additional Information (if needed):

\_\_\_\_\_



**CONTRACTOR SAFETY SELF- EVALUATION CHECKLIST**



PWD/ROICC/OICC/FSC OFFICE:

DATE:

FINAL OVERALL SCORE:

CONTRACTOR:

CONTRACT% COMPLETE:

TOTAL MONTHLY MAN-HOURS:

CONTRACT TITLE:

QC MANAGER:

TOTAL CUMULATIVE MAN-HOURS:

SUPERINTENDENT:

PERSON COMPLETING INSPECTION:

SITE SAFETY HEALTH OFFICER (SSHO):

SSHO LEVEL: (CIRCLE REQUIRED LEVEL) (1), (2), (3), (4), (5), (6)

QUESTIONS ANSWERED "NO" ARE BE ENTERED INTO THE SITE SAFETY AND OCCUPATIONAL HEALTH DEFICIENCY TRACKING SYSTEM FOR CORRECTION (REFER TO EM 385-1-1 01.A.12.d)

**PREPARATORY PHASE/ ORM PLANNING**

1	(Yes) (No) (N/A)	ACCEPTED ACCIDENT PREVENTION PLAN (APP) OR ABBREVIATED (APP) ON-SITE and UPDATED TO REFLECT CURRENT MANAGEMENT?
2	(Yes) (No) (N/A)	APPLICABLE UFGS 013526 AVAILABLE IN SITE ?
3	(Yes) (No) (N/A)	COMPETENT PERSON EMPLOYED FULL TIME AS SITE SAFETY AND HEALTH OFFICER (SSH0) UNLESS SPECIFIED DIFFERENTLY IN THE CONTRACT ?
4	(Yes) (No) (N/A)	SSHO ON - SITE AT ALL TIMES WHEN WORK IS BEING PERFORMED ?
5	(Yes) (No) (N/A)	SAFETY INSPECTIONS/AUDITS CONDUCTED BY COMPETENT PERSON, OF THE WORK SITE, MATERIAL, AND EQUIPMENT DOCUMENTED IN WRITING AND AVAILABLE ON REQUEST?
6	(Yes) (No) (N/A)	SAFETY AND HEALTH BULLETIN BOARD ERECTED IN AREA COMMONLY ACCESSED AND IN CLEAR VIEW OF THE ON-SITE WORKERS?
7	(Yes) (No) (N/A)	SAFETY AND OCCUPATIONAL HEALTH DEFICIENCY TRACKING SYSTEM ESTABLISHED and UPDATED DAILY (REFER TO EM 385-1-1 01.A.12.d)?
8	(Yes) (No) (N/A)	QUALIFIED PERSON CONDUCTING/DOCUMENTING ALL TRAINING, MEETINGS AND INDOCTRINATION FOR NEW EMPLOYEES?
9	(Yes) (No) (N/A)	ACTIVITY HAZARD ANALYSIS (AHA) with COMPETENT PERSON IDENTIFIED and PROOF OF QUALIFICATIONS ATTACHED and ACCEPTED BY GOVERNMENT DESIGNATED AUTHORITY FOR EACH WORK ACTIVITY ON SITE?
10	(Yes) (No) (N/A)	WORK NOT STARTED UNTIL ACTIVITY HAZARD ANALYSIS REVIEWED BY CONTRACTOR, SUBCONTRACTOR(S) AND GOVERNMENT ON-SITE REPRESENTATIVES DURING PREPARATION and INITIAL PHASE MEETING?
11	(Yes) (No) (N/A)	ARE REQUIRED WEEKLY SAFETY MEETINGS FOR ALL WORKERS TO REVIEW PAST ACTIVITIES, PLAN FOR NEW OR CHANGED OPERATIONS, REVIEW AHA'S BY TRADE, ESTABLISH SAFE WORKING PROCEDURES FOR UPCOMING HAZARDS, PROVIDE SAFETY AND HEALTH TRAINING BEING HELD AND DOCUMENTED?
12	(Yes) (No) (N/A)	ARE REQUIRED MONTHLY SAFETY MEETINGS FOR ALL SUPERVISORS ON THE PROJECT LOCATION TO REVIEW PAST ACTIVITIES, PLAN FOR NEW OR CHANGED OPERATIONS, REVIEW AHA'S BY TRADE, ESTABLISH SAFE WORKING PROCEDURES FOR UPCOMING HAZARDS, PROVIDE SAFETY AND HEALTH TRAINING BEING HELD AND DOCUMENTED?
13	(Yes) (No) (N/A)	WRITTEN HAZARD COMMUNICATION PROGRAM SUBMITTED and IMPLEMENTED IAW EM 385 SECTION 06.B.01 ?
14	(Yes) (No) (N/A)	MSDS FOR EACH HAZARDOUS SUBSTANCE MAINTAINED WITH SITE MAP ATTACHED?
15	(Yes) (No) (N/A)	PRIME CONTRACTOR ASSURING SUBCONTRACTOR COMPLIANCE WITH REQUIREMENTS OF EM-385-1-1?
		Other? Extra Credit?

**OFFICE TRAILER/SIGNAGE/GENERAL**

16	(Yes) (No) (N/A)	OFFICE AND STORAGE TRAILERS ANCHORED?
17	(Yes) (No) (N/A)	EMERGENCY PHONE NUMBERS POSTED?
18	(Yes) (No) (N/A)	TEMPORARY PROJECT FENCING WHICH EXTENDS FROM GRADE LEVEL TO A MINIMUM OF 48IN. ABOVE GRADE? (UNLESS GDA DETERMINES OTHERWISE BASED ON RISK ANALYSIS)
19	(Yes) (No) (N/A)	SIGNS WARNING OF THE PRESENCE OF CONSTRUCTION HAZARDS AND REQUIRING UNAUTHORIZED PERSONS TO KEEP OUT POSTED ON THE FENCING EVERY 150 FEET?
20	(Yes) (No) (N/A)	CONTRACTOR AWARE OF IMMEDIATE NOTIFICATION FOR ALL INJURIES REQUIRED BY PWD/ROICC/OICC/FSC OFFICE?
21	(Yes) (No) (N/A)	EMERGENCY PLANS IN CASE OF FIRE OR OTHER EMERGENCY PREPARED IN WRITING AND REVIEWED?
22	(Yes) (No) (N/A)	DRINKING WATER WITH DISPOSABLE CUPS AND A WASTE RECEPTACLE AVAILABLE?
23	(Yes) (No) (N/A)	TOILET FACILITIES WITH WASHING FACILITIES AVAILABLE?
24	(Yes) (No) (N/A)	HIGHLY VISIBLE MAP DELINEATING BEST ROUTE TO NEAREST MEDICAL FACILITY POSTED ON SAFETY BULLETIN BOARD?
25	(Yes) (No) (N/A)	FIRST-AID KIT, TYPE III, 16 UNIT, and ONE POCKET MOUTH PIECE OR CPR BARRIER PROVIDED AND MAINTAINED WITH INVENTORY LOG AVAILABLE?
26	(Yes) (No) (N/A)	ALL EMPLOYEES ON SITE WEARING AS A MINIMUM SHORT SLEEVE SHIRT, LONG PANTS, LEATHER OR OTHER PROTECTIVE WORK SHOES OR BOOTS
27	(Yes) (No) (N/A)	EVERY FLOOR, WORKING PLACE AND PASSAGEWAY KEPT FREE FROM PROTRUDING NAILS, SPLINTERS, LOOSE BOARDS, CLUTTER AND UNNECESSARY HOLES AND OPENING?
28	(Yes) (No) (N/A)	WORK AREAS INSPECTED DAILY FOR ADEQUATE HOUSEKEEPING AND RECORDED ON DAILY SAFETY INSPECTION REPORT?
29	(Yes) (No) (N/A)	TRAFFIC CONTROL AROUND SITE ADEQUATE?
		Other? Extra Credit?

**FIRE PREVENTION**

30	(Yes) (No) (N/A)	WRITTEN FIRE PREVENTION PLAN ON SITE AND USED TO BRIEF EMPLOYEES?
31	(Yes) (No) (N/A)	FIRE EXTINGUISHERS AVAILABLE, FULLY CHARGED, EASILY VISIBLE WITHIN 75 FEET FOR LOW HAZARD AREAS?
32	(Yes) (No) (N/A)	FIRE EXTINGUISHERS INSPECTED MONTHLY, RECORDED ON TAGS, AND INITIALED?
33	(Yes) (No) (N/A)	FUEL STORED IN SAFETY CANS LABELED/LISTED and PAINTED RED WITH YELLOW BAND AND CONTENTS INDICATED?
34	(Yes) (No) (N/A)	ARE HOT WORK PERMITS BEING OBTAINED FOR WELDING, CUTTING OR OPERATING OTHER FLAME-PRODUCING/SPARK PRODUCING DEVICES FROM THE FIRE DEPARTMENT?
35	(Yes) (No) (N/A)	ARE FIRE WATCHES PROVIDED?
		Other? Extra Credit?

**PPE**

36	(Yes) (No) (N/A)	WORKERS WEARING SAFETY-TOED LEATHER SHOES OR BOOTS MEETING ASTM F 2412 - 05 AND F 2413 - 05 ?
37	(Yes) (No) (N/A)	HARD HATS BEING WORN PROPERLY AND MEETING ANSI Z89.1?
38	(Yes) (No) (N/A)	ARE WORKERS INVOLVED IN ACTIVITIES THAT SUBJECT HANDS TO INJURY USING HAND PROTECTION APPROPRIATE FOR THE HAZARD?
39	(Yes) (No) (N/A)	SAFETY GLASSES USED WHERE APPROPRIATE?
40	(Yes) (No) (N/A)	HEARING PROTECTION WHERE APPROPRIATE? (IF YOU NEED TO YELL TO CONVERSE HEARING PROTECTION IS REQUIRED)
41	(Yes) (No) (N/A)	WORKERS WEARING RESPIRATORS WHERE APPROPRIATE?
42	(Yes) (No) (N/A)	IMPALEMENT PROTECTION PROVIDED WHERE PERSONNEL COULD WORK ABOVE VERTICAL IMPALEMENT HAZARD (Rebar etc.)?
43	(Yes) (No) (N/A)	ARE PROTECTIVE LEG CHAPS WORN BY WORKERS WHO OPERATE CHAIN SAWS?
44	(Yes) (No) (N/A)	HIGH VISIBILITY APPAREL BEING WORN WHEN WORKERS ON SITE ARE EXPOSED TO VEHICULAR OR EQUIPMENT TRAFFIC AT UP TO 45 MPH, THERE IS LIMITED OR REDUCED VISIBILITY FOR WORKERS AROUND MOBILE/HEAVY EQUIPMENT OR WORKERS ARE WORKING CLOSE TO VEHICULAR TRAFFIC WITH NO PROTECTIVE BARRIERS?
		OTHER? EXTRA CREDIT?

## SCAFFOLD SAFETY

45	(Yes) (No) (N/A)	HAS A SITE-SPECIFIC FALL PROTECTION AND PREVENTION PLAN and AHA BEEN ACCEPTED BY THE GDA PRIOR TO COMMENCING WORK IN ELEVATED AREAS?
46	(Yes) (No) (N/A)	ALL ERECTION, MOVING, DISMANTLING, OR ALTERING OF SCAFFOLD SYSTEMS UNDER THE SUPERVISION OF A COMPETENT PERSON?
47	(Yes) (No) (N/A)	COMPETENT PERSON USING A COLOR-CODED TAGGING SYSTEM? ( GREEN = INSPECTED & SAFE TO USE) ( RED = SCAFFOLD IS UNSAFE TO USE)
48	(Yes) (No) (N/A)	PLANKS OVERLAPPED NOT LESS THAN 6" OR MORE THAN 12" OVER END SUPPORTS WITH TOE BOARDS IN PLACE?
49	(Yes) (No) (N/A)	SCAFFOLD PINNED PROPERLY AND ALL CROSS BRACING IN PLACE?
50	(Yes) (No) (N/A)	SCAFFOLD HEIGHT 4 TIMES SMALLEST BASE DIMENSION AND SYSTEM IS SECURED TO STRUCTURE?
51	(Yes) (No) (N/A)	ALL GUARDRAILS ARE IN PLACE?
52	(Yes) (No) (N/A)	FULL WORK PLATFORM OR DECKS AT EACH WORKING LEVEL WITH NO CRACKS/SPLITS?
53	(Yes) (No) (N/A)	WORK PLATFORM OR DECK SECURELY FASTENED TO THE SCAFFOLD?
54	(Yes) (No) (N/A)	SAFE ACCESS PROVIDED TO EACH WORKING LEVEL?
55	(Yes) (No) (N/A)	IS SCAFFOLD SYSTEM PLUMB AND LEVEL?
56	(Yes) (No) (N/A)	SUSPENDED SCAFFOLD SYSTEMS USING INDEPENDENT PERSONAL FALL ARREST SYSTEM?
57	(Yes) (No) (N/A)	PERSONNEL PROHIBITED FROM RIDING ON MANUALLY PROPELLED SCAFFOLDS?
		Other? Extra Credit?

## FALL PROTECTION

58	(Yes) (No) (N/A)	HAS SITE-SPECIFIC FALL PROTECTION AND PREVENTION PLAN BEEN ACCEPTED?
59	(Yes) (No) (N/A)	WORKERS USING FALL PROTECTION EQUIPMENT USING "BUDDY SYSTEM" TO BEGIN RESCUE OF FALLEN WORKER IF REQUIRED
60	(Yes) (No) (N/A)	ALL WORKERS ABOVE 6 FOOT FALL PROTECTION THRESHOLD PROTECTED FROM FALLING TO LOWER LEVEL?
61	(Yes) (No) (N/A)	ARE EMPLOYEES TRAINED FOR FALL PROTECTION SYSTEMS IN USE?
62	(Yes) (No) (N/A)	HAS THE CONTRACTOR DESIGNATED A COMPETENT PERSON FOR FALL PROTECTION?
63	(Yes) (No) (N/A)	IS A WRITTEN RESCUE PLAN (IAW ANSI Z359.2) BEEN PREPARED AND MAINTAINED WHEN WORKERS ARE WORKING AT HEIGHTS ?
64	(Yes) (No) (N/A)	IS A FULL BODY HARNESS USED?
65	(Yes) (No) (N/A)	ALL WORKERS ALOFT TIED OFF AT ALL TIMES (100%) TO STRUCTURAL ELEMENT CAPABLE OF SUPPORTING 5,000 LBS?
66	(Yes) (No) (N/A)	HAVE STANDARD GUARDRAILS BEEN PROVIDED WHERE NEEDED?
67	(Yes) (No) (N/A)	ACCESS TO WORK AREAS GREATER THAN 20 FEET HIGH PROVIDED WITH A STAIR SYSTEM?
68	(Yes) (No) (N/A)	HAVE HORIZONTAL LIFE LINES IF USED BEEN DESIGNED AND INSTALLED UNDER SUPERVISION OF A QUALIFIED PERSON?
		OTHER? EXTRA CREDIT?

## LADDER SAFETY

69	(Yes) (No) (N/A)	LADDERS EXTEND 3' ABOVE LANDING PLATFORM AND TIED TO STRUCTURE?
70	(Yes) (No) (N/A)	ARE LADDERS USED WITH HAND TOOLS ONLY?
71	(Yes) (No) (N/A)	ARE LADDER BASE DISTANCES FROM STRUCTURE 1/4 HEIGHT?
72	(Yes) (No) (N/A)	ALL FLOOR OPENINGS EITHER COVERED OR SURROUNDED BY A GUARDRAIL?
73	(Yes) (No) (N/A)	ELECTRICIANS NOT USING CONDUCTIVE LADDERS?
74	(Yes) (No) (N/A)	STAIRWAYS PROVIDED ON ALL STRUCTURES OVER 20' DURING CONSTRUCTION/WITH GUARDRAIL?
75	(Yes) (No) (N/A)	ALL FLIGHTS OF STAIRS WITH 4 OR MORE RISERS HAVE STANDARD STAIR RAILINGS OR HANDRAILS
76	(Yes) (No) (N/A)	PORTABLE STEP LADDERS OVER 20' NOT USED ON THE SITE?
77	(Yes) (No) (N/A)	ARE LADDERS PROPERLY USED?
		OTHER? EXTRA CREDIT?

## EXCAVATIONS

78	(Yes) (No) (N/A)	HAS EXCAVATION/TRENCHING PLAN IN ACCORDANCE WITH (SECTION 25.A.01 a - n) BEEN SUBMITTED AND ACCEPTED BY THE GDA PRIOR TO BEGINNING OPERATIONS?
79	(Yes) (No) (N/A)	COMPETENT PERSON ABLE TO DEMONSTRATE TRAINING, EXPERIENCE AND KNOWLEDGE OF SOIL ANALYSIS: PROTECTIVE SYSTEMS AND REQUIREMENTS OF 29 CFR 1926 SUBPART P AND HAS AUTHORITY TO STOP WORK WHEN REQUIRED?
80	(Yes) (No) (N/A)	COMPETENT PERSON INSPECTED AND DOCUMENTED EXCAVATION DAILY?
81	(Yes) (No) (N/A)	HIGH VISIBILITY APPAREL WORN BY ALL WORKERS EXPOSED TO VEHICLE TRAFFIC OR WORKING AROUND EQUIPMENT
82	(Yes) (No) (N/A)	HYDRAULIC EXCAVATORS, WHEEL/TRUCK/BACKHOE LOADERS USED TO TRANSPORT OR HOIST LOADS WITH RIGGING COMPLY WITH EM 385 SECTION 16 "S" AND HAVE AHA SPECIFIC TO THESE OPERATIONS?
83	(Yes) (No) (N/A)	WRITTEN PROOF OF QUALIFICATION OF EQUIPMENT OPERATORS, RIGGERS INVOLVED IN HOISTING, TRANSPORTING OPERATIONS?
84	(Yes) (No) (N/A)	OPERATIONAL TEST PERFORMED AS DESCRIBED IN 16.F?
85	(Yes) (No) (N/A)	MANUFACTURERS OPERATING MANUAL WITH EQUIPMENT?
86	(Yes) (No) (N/A)	PROPER USE OF RIGGING, INCLUDING POSITIVE LATCHING DEVICES?
87	(Yes) (No) (N/A)	INSPECTION OF RIGGING
88	(Yes) (No) (N/A)	BARRICADE SWING RADIUS OF EQUIPMENT AND LOAD?
89	(Yes) (No) (N/A)	OVER 4' DEEP MUST HAVE A LADDER WITHIN 25' AND TWO MEANS OF EGRESS?
90	(Yes) (No) (N/A)	HAS PROPER SLOPE OR TRENCH BOX/SHORING BEEN PROVIDED?
91	(Yes) (No) (N/A)	IS WATER CONTROLLED/REMOVED?
92	(Yes) (No) (N/A)	IS EXCAVATED MATERIAL AT LEAST 2' BACK FROM TRENCH EDGE?
93	(Yes) (No) (N/A)	HAS SAFE ACCESS/PROTECTION BEEN PROVIDED TO PREVENT PERSONNEL, VEHICLES, AND EQUIPMENT FROM FALLING INTO EXCAVATIONS?
94	(Yes) (No) (N/A)	PERIMETER PROTECTION THAT MEETS CLASS I or CLASS II or CLASS III REQUIREMENTS PROVIDED?
		OTHER? EXTRA CREDIT?

ELECTRICAL			
95	(Yes) (No) (N/A)	HAS A SKETCH OF TEMPORARY POWER DISTRIBUTION SYSTEMS BEEN SUBMITTED /ACCEPTED BY GDA?	
96	(Yes) (No) (N/A)	ELECTRICAL WORK PERFORMED BY QUALIFIED PERSONNEL WITH VERIFIABLE CREDENTIALS?	
97	(Yes) (No) (N/A)	ENERGIZED WORK PERMIT SUBMITTED TO GDA PRIOR TO ANY WORK ON ENERGIZED LINES ON EQUIPMENT AND IAW NFPA70E AND EM 385 I.E.. 02 C(1) - (8)	
98	(Yes) (No) (N/A)	ARE ARC FLASH REQUIREMENTS KNOWN AND ADHERED TO?	
99	(Yes) (No) (N/A)	ARE TEMPORARY POWER PANEL AND RECEPTACLES PROTECTED FROM WEATHER?	
100	(Yes) (No) (N/A)	GFCI'S IN USE FOR SITE TOOLS - APPLIES TO EXISTING OUTLETS IN RENOVATION PROJECTS AS WELL?	
101	(Yes) (No) (N/A)	TEMPORARY LIGHTS INSULATED FROM SUPPORTS PROPERLY WITH ALL LAMPS WORKING AND GUARDED?	
102	(Yes) (No) (N/A)	OVERHEAD POWER LINES IN AREA, OPERATIONS PROHIBITED UNLESS MAINTAINING PROPER CLEARANCE DISTANCES?	
103	(Yes) (No) (N/A)	HAS HAZARDOUS ENERGY CONTROL PROGRAM BEEN SUBMITTED AND ACCEPTED BY GDA? (OLD LOCK OUT/TAG OUT )	
104	(Yes) (No) (N/A)	VERTICAL CLEARANCE OF TEMPORARY WIRING OF AT LEAST 10 FEET MAINTAINED ?	
105	(Yes) (No) (N/A)	ALL FLEXIBLE CORDS INSPECTED AT LEAST DAILY? DOCUMENTED?	
106	(Yes) (No) (N/A)	FLEXIBLE CORDS NOT SPLICED EXCEPT HARD SERVICE CORDS # 12 OR LARGER WITH MOLDED OR VULCANIZED SPLICES BY QUALIFIED ELECTRICIAN?	
		OTHER? EXTRA CREDIT?	
CRANES			
107	(Yes) (No) (N/A)	BEFORE CRANE/HOISTING EQUIPMENT IS PLACED IN SERVICE HAS IT BEEN INSPECTED, TESTED, AND CERTIFIED IN WRITING BY A COMPETENT PERSON TO BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AND THE REQUIREMENTS OF EM 385?	
108	(Yes) (No) (N/A)	CRANE OPERATOR DESIGNATED QUALIFIED AND PROOF OF QUALIFICATION IN WRITING PROVIDED TO THE GDA?	
109	(Yes) (No) (N/A)	PROJECT HAS ADEQUATE MEANS FOR MONITORING LOCAL WEATHER CONDITIONS, INCLUDING A WIND-INDICATING DEVICE?	
110	(Yes) (No) (N/A)	ARE EM 385-1-1 16.D.08 (AT THE BEGINNING OF EACH SHIFT) START UP INSPECTIONS PERFORMED BY OPERATOR AND SUBMITTED WITH DRI?	
111	(Yes) (No) (N/A)	HAS THE PERIODIC INSPECTION BEEN PERFORMED PRIOR TO USE ON SITE IAW EM 385-1-1, TABLE 16-1 AND 16.D.10?	
112	(Yes) (No) (N/A)	IS CRANE EQUIPPED WITH ANTI TWO-BLOCK DEVICE IF REQUIRED?	
113	(Yes) (No) (N/A)	IS THE CRANE LEVEL AND ON FIRM GROUND AND OUTRIGGERS IN USE WITH APPROPRIATE CRIBBING?	
114	(Yes) (No) (N/A)	IAW 16.G.09 WHEN CRANE IS OPERATED WITHIN 20 FOOT OF POWER LINES (OPERATING WORK ZONE IS AREA 360 DEGREES AROUND CRANE) HAS A DETERMINATION BEEN MADE THAT ALL POWER LINES ARE ENERGIZED?	
115	(Yes) (No) (N/A)	IAW TABLE 16-3 CRANE NOT ALLOWED TO WORK CLOSER THAN 10 FOOT OF ENERGIZED POWER LINES (DEPENDING ON ACTUAL VOLTAGE OF LINES	
116	(Yes) (No) (N/A)	IS CRANE SIDE LOADING PROHIBITED?	
117	(Yes) (No) (N/A)	ARE RIGGING CABLES AND SLINGS INSPECTED BY A COMPETENT PERSON BEFORE EACH SHIFT?	
118	(Yes) (No) (N/A)	ARE WORKERS PROTECTED FROM THE CRANE SWING RADIUS AND PREVENTED FROM PASSING UNDER THE LOAD?	
		OTHER? EXTRA CREDIT?	
CONFINED SPACE			
119	(Yes) (No) (N/A)	ALL CONFINED SPACE WORK IAW EM 385 SECTION 34.A.06?	
120	(Yes) (No) (N/A)	IS CONFINED SPACE COMPETENT PERSON (CSCP), IN WRITING, IDENTIFIED?	
121	(Yes) (No) (N/A)	IS ATMOSPHERE BEING MONITORED?	
122	(Yes) (No) (N/A)	IS SPACE BEING VENTILATED?	
123	(Yes) (No) (N/A)	ARE ENTRANTS, ATTENDANTS AND ENTRY SUPERVISOR PROPERLY TRAINED?	
124	(Yes) (No) (N/A)	IS RESCUE/RETRIEVAL SYSTEM IN PLACE FOR PERMIT REQUIRED CONFINED PLACES?	
125	(Yes) (No) (N/A)	ARE ENTRY PERMITS POSTED AT POINT OF ENTRY AND SIGNED BY ENTRY SUPERVISOR?	
126	(Yes) (No) (N/A)	IS THE POINT OF ENTRY POSTED "DANGER CONFINED SPACE"?	
127	(Yes) (No) (N/A)	HAS BLANKING OR LOCKING OUT OF SYSTEMS TAKEN PLACE?	
		OTHER? EXTRA CREDIT?	
ROOFING			
128	(Yes) (No) (N/A)	HAS STRUCTURAL ANALYSIS OF THE ROOF BEEN CONDUCTED BY A QUALIFIED PERSON ?	
129	(Yes) (No) (N/A)	HAS COMPETENT PERSON COMPLETED A DAILY INSPECTION?	
130	(Yes) (No) (N/A)	HAS COMPETENT PERSON DEVELOPED A FALL PROTECTION PLAN, SUBMITTED/ACCEPTED BY GDA?	
131	(Yes) (No) (N/A)	ARE KETTLES AT LEAST 25 FEET AWAY FROM BUILDINGS?	
132	(Yes) (No) (N/A)	IS KETTLE ATTENDANT WEARING PROPER PPE AT ALL TIMES?	
133	(Yes) (No) (N/A)	ARE TWO FIRE EXTINGUISHERS AT THE KETTLE?	
134	(Yes) (No) (N/A)	ARE SKYLIGHTS AND ROOF PENETRATIONS COVERED OR BARRICADED APPROPRIATELY?	
135	(Yes) (No) (N/A)	HAS THE ROOF BEEN EVALUATED FOR ITS ABILITY TO SUPPORT THE INTENDED CONSTRUCTION LOADS?	
136	(Yes) (No) (N/A)	IF WARNING LINES ON LOW SLOPED ROOFS ARE USED, ARE THEY PROPERLY INSTALLED/MAINTAINED?	
137	(Yes) (No) (N/A)	ARE FUEL CYLINDERS A MINIMUM OF 10' FROM OPEN FLAME?	
		OTHER? EXTRA CREDIT?	
EQUIPMENT			
138	(Yes) (No) (N/A)	ALL MACHINERY OR EQUIPMENT INSPECTED DAILY, WHEN IN USE, BY COMPETENT PERSONS?	
139	(Yes) (No) (N/A)	ARE OPERATORS TRAINED AND AUTHORIZED TO OPERATE POWERED INDUSTRIAL TRUCKS, LIFT TRUCKS, AND SIMILAR EQUIPMENT?	
140	(Yes) (No) (N/A)	MOBILE EQUIPMENT EQUIPPED WITH BACKUP ALARMS? ROLLOVER CAGES/ MOVING PARTS ADEQUATELY GUARDED?	
141	(Yes) (No) (N/A)	ARE EQUIPMENT OPERATIONS MAINTAINING SAFE CLEARANCE FROM ELECTRICAL POWER LINES?	
142	(Yes) (No) (N/A)	MODIFICATIONS MEET MANUFACTURER INSTRUCTIONS (I.E., LIFTING PERSONNEL WITH FORKLIFT - (NOT ALLOWED BY MANY MANUFACTURERS)?	
143	(Yes) (No) (N/A)	ARE SAFETY LASHINGS PROVIDED FOR HIGH PRESSURE HOSE CONNECTIONS, I.E., AIR COMPRESSORS?	
144	(Yes) (No) (N/A)	ARE WORKERS CLEAR OF BLIND SPOTS ASSOCIATED WITH MOBILE CONSTRUCTION EQUIPMENT?	
145	(Yes) (No) (N/A)	ARE DAILY WALK AROUND INSPECTIONS OF AERIAL LIFTS PERFORMED AND DOCUMENTED BY QUALIFIED OPERATORS?	
146	(Yes) (No) (N/A)	DO AERIAL LIFTS HAVE BASKET/PLATFORM WITH GUARDRAIL?	
147	(Yes) (No) (N/A)	WORKERS NOT EXTENDING OVER GUARDRAIL OF AERIAL LIFTS?	
148	(Yes) (No) (N/A)	ARE ARTICULATING BOOM PLATFORMS (JLG TYPE) USED WITH FULL BODY HARNESS ATTACHED TO PROPER ATTACHMENT POINTS ON BOOM OR BASKET?	
149	(Yes) (No) (N/A)	ARE DUMP TRUCK CHECKLISTS BEING USED AND COPIES KEPT ON SITE?	
150	(Yes) (No) (N/A)	INSPECTION, MAINTENANCE, AND REPAIRS TO CONVEYORS PERFORMED IAW MANUFACTURER'S RECOMMENDATIONS BY QUALIFIED PERSONNEL?	
151	(Yes) (No) (N/A)	EXPOSED MOVING MACHINERY PARTS MECHANICALLY OR ELECTRICALLY GUARDED?	
152	(Yes) (No) (N/A)	WHEN TWO OR MORE CONVEYING SYSTEMS ARE INTERFACED ARE ADEQUATE GUARDING AND SAFETY DEVICES IN PLACE?	
		OTHER? EXTRA CREDIT?	



## TREE MAINTENANCE AND REMOVAL

153	(Yes) (No) (N/A)	ALL TREE MAINTENANCE OR REMOVAL PERFORMED UNDER THE DIRECTION OF A QUALIFIED TREE WORKER?
154	(Yes) (No) (N/A)	ONLY QUALIFIED LINE-CLEARANCE TREE TRIMMER OR LINE-CLEARANCE TRAINEE ASSIGNED TO WORK IN CLOSE PROXIMITY TO ELECTRICAL HAZARDS?
155	(Yes) (No) (N/A)	TREE WORKERS IN A BUCKET OR WORK PLATFORM USING FALL PROTECTION
156	(Yes) (No) (N/A)	ALL TREE WORK OPERATIONS ABOVE 12 FOOT HAVE A 2ND WORKER IN THE AREA
157	(Yes) (No) (N/A)	PRIOR TO FELLING OPERATIONS HAS WORK AREA BEEN CLEARED AND ESCAPE ROUTE PLANNED?
158	(Yes) (No) (N/A)	ALL EMPLOYEES WORKING FROM THE UPHILL SIDE WHENEVER POSSIBLE?

## DEMOLITION

159	(Yes) (No) (N/A)	HAS DEMOLITION PLAN, BASED ON ENGINEERING, LEAD, AND ASBESTOS SURVEY BY A REGISTERED PROFESSIONAL ENGINEER BEEN ACCEPTED?
160	(Yes) (No) (N/A)	WASTE NOT BEING DROPPED > 6' UNLESS IN AN ENCLOSED CHUTE AND AREA SECURED FROM TRAFFIC?
161	(Yes) (No) (N/A)	FOR BUILDING DEMOLITION, HAS NOTIFICATION BEEN MADE TO STATE HAVING JURISDICTION?
162	(Yes) (No) (N/A)	ARE NAILS REMOVED FROM SCRAP LUMBER/MATERIALS?
163	(Yes) (No) (N/A)	FRAGMENTATION OF GLASS CONTROLLED?
164	(Yes) (No) (N/A)	MATERIAL CHUTES AT AN ANGLE GREATER THAN 45° FROM THE HORIZONTAL ENCLOSED?
		OTHER? EXTRA CREDIT?

## ABATEMENT

165	(Yes) (No) (N/A)	HAS ABATEMENT PLAN BEEN SUBMITTED AND ACCEPTED?
166	(Yes) (No) (N/A)	IS INDEPENDENT AIR MONITORING BEING PERFORMED AS REQUIRED INSIDE AND OUTSIDE BARRIERS?
167	(Yes) (No) (N/A)	IS CONTAINMENT IN PLACE WITHOUT INTEGRITY COMPROMISE?
168	(Yes) (No) (N/A)	ARE EMPLOYEES UTILIZING APPROPRIATE PPE?
169	(Yes) (No) (N/A)	IF NEGATIVE AIR IS USED, ARE FANS USED CONTINUOUSLY AND MONITORED FOR PRESSURE DIFFERENTIAL?
170	(Yes) (No) (N/A)	HAS BASELINE BEEN PERFORMED AND NECESSARY FINAL CLEARANCE READINGS TAKEN?
171	(Yes) (No) (N/A)	ARE INSPECTIONS BY INDEPENDENT PQP PERFORMED PRIOR TO BARRIER REMOVAL?
172	(Yes) (No) (N/A)	IS WASTE MATERIAL PROPERLY CONTAINERIZED AND STORED?
173	(Yes) (No) (N/A)	ARE AIR MONITORING RESULTS PROVIDED TO GDA?
174	(Yes) (No) (N/A)	ARE WASTE SHIPMENT RECORDS PROVIDED TO GDA?
		OTHER? EXTRA CREDIT?

## WATERFRONT ACTIVITIES

175	(Yes) (No) (N/A)	WORK OVER OR NEAR WATER AND THE DISTANCE TO WATER SURFACE IS LESS THAN 25 FEET OR MORE AND THE WATER DEPTH IS LESS THAN 10 FEET ARE FALL PROTECTION REQUIREMENTS FOLLOWED? (PFDs NOT REQUIRED)
176	(Yes) (No) (N/A)	WORK OVER OR NEAR WATER AND THE DISTANCE TO WATER SURFACE IS 25 FEET OR MORE ARE FALL PROTECTION REQUIREMENTS FOLLOWED?
177	(Yes) (No) (N/A)	MARINE FALL PROTECTION RAILING TYPE A or TYPE B PROVIDED FOR VESSEL DECKS 6 FT OR MORE ABOVE ADJACENT DECKS, DOCKS, OR OTHER HARD SURFACES?
178	(Yes) (No) (N/A)	PFD's WORN BY PERSONNEL IN AREAS WHERE DECK PERIMETER IS NOT PRESENT
179	(Yes) (No) (N/A)	IS A RESCUE SKIFF AVAILABLE?
180	(Yes) (No) (N/A)	ARE EMERGENCY LIFE RINGS AVAILABLE?
181	(Yes) (No) (N/A)	IF DIVING OPERATIONS ARE TAKING PLACE, HAS A DIVE PLAN BEEN SUBMITTED AND ACCEPTED BY THE DDC?
182	(Yes) (No) (N/A)	IF DIVING, IS FIRST-AID KIT, OXYGEN RESUSCITATION SYSTEM, (30 MINUTE SUPPLY), AND A STOKES LITTER OR BACKBOARD WITH FLOATATION CAPABILITY ON SITE?
183	(Yes) (No) (N/A)	DOES DIVE TEAM CONSIST OF PROPER NUMBER AND QUALIFICATIONS FOR EMPLOYEES?
184	(Yes) (No) (N/A)	HAND RAILS USED FOR FALL PROTECTION ON ALL MARINE VESSELS FOR CONTRACTS AWARDED SINCE MARCH 2007
185	(Yes) (No) (N/A)	MARINE (VESSEL) DECKS 6 FEET OR MORE ABOVE OTHER SURFACES HAVE TYPE A OR TYPE B FALL PROTECTION PROVIDED?
		OTHER? EXTRA CREDIT?

SCORING: Total applicable for each category = X (where X includes responses for category of "Yes" and "No" but does not include N/A)

Total with "Yes" responses for each category = Y \* SCORE EQUATION = Y/X \*

## SCORE FOR EACH CATEGORY:

	1. PREPARATORY PHASE: _____	7. LADDER SAFETY: _____	13.EQUIPMENT: _____
	2. OFFICE TRAILER: _____	8. EXCAVATIONS: _____	14. TREE MAINTENANCE : _____
	3. FIRE PREVENTION: _____	9. ELECTRICAL: _____	15. DEMOLITION: _____
	4. PPE : _____	10. CRANES: _____	16: ABATEMENT: _____
	5. SCAFFOLD SAFETY: _____	11. CONFINED SPACES: _____	17: WATERFRONT: _____
	6. FALL PROTECTION: _____	12. ROOFING: _____	

OVERALL RATING OF CHECKLIST EQUALS LOWEST RATING FOR ANY ONE CATEGORY: \_\_\_\_\_

QUESTIONS ANSWERED "NO" ARE BE ENTERED INTO THE SITE SAFETY &amp; OCCUPATIONAL HEALTH DEFICIENCY TRACKING SYSTEM (REFER TO EM 385-1-1 01.A.12.d)

ALTERATION OR CHANGING OF THIS FORM IS NOT AUTHORIZED

## COMMENTS:

## DAILY QUALITY CONTROL REPORT

<b>Date:</b>	<b>Contract #:</b>	<b>Task Order #:</b>
<b>Site/Location:</b>		
<b>Weather:</b>	<b>Temperature:</b>	<b>Rainfall:</b>

**1. Preparatory Inspection:**

**Results:**

**2. QC Audits Performed:**

**a. Operations:**

**Results:**

**b. Safety:**

**Results:**

**c. Administrative:**

**Results:**

**d. Equipment:**

**Results:**



**DAILY SITE REPORT**

<b>SECTION 1 GENERAL INFORMATION</b>					
Project Name:		Customer(s) Name:		Report No.:	
Contract No.:	TO No.:	Completion Date:	Location:	Date of Report:	
SUXOS Name:		Telephone No.:	Email Address:		
Site Manager's Name:		Telephone No.:	Email Address:		
Customer POC Name:		Telephone No.:	Email Address:		
Project Web Portal Address:					
<b>SECTION 2 WEATHER</b>					
Temp: High / Low		Precipitation / Humidity		Wind:	Work Impact / Remarks:
<b>SECTION 3 USA ASSIGNED PERSONNEL</b>					
Position:	No. Assigned:	No. Present:	Position:	No. Assigned:	No. Present:
Site Manager			UXOT II		
SUXOS			UXOT I		
UXOQCS					
UXOSO					
UXOT III					
<b>SECTION 4 SUBCONTRACTOR ASSIGNED PERSONNEL</b>					
Position:	No. Assigned:	No. Present:	Position:	No. Assigned:	No. Present:
<b>SECTION 5 SUBCONTRACTOR / RENTAL HEAVY EQUIPMENT ONSITE</b>					
Description:	Quantity:	Operational:	Owner:	Remarks:	
<b>SECTION 6 TASK(S) PERFORMED</b>					
Task Performed:	Acres/Grids:	Transects:	Re-Acquire:	Digs:	Other:
Surface					
Subsurface					
DGM / GIS					
Devegetation					
Demolition					
Survey					
Support					

SECTION 7 WORK DETAILS				
Acres/Grids:	Transects:	Re-Acquire:	Digs:	Remarks:

SECTION 8 SAFETY DATA	
1) Were safety inspections held? <input type="checkbox"/> Y <input type="checkbox"/> N General <input type="checkbox"/> Tailgate <input type="checkbox"/> Task Specific <input type="checkbox"/>	2) Was HW found or recovered today? <input type="checkbox"/> Y <input type="checkbox"/> N Type:
3) Were there any accidents? <input type="checkbox"/> Y <input type="checkbox"/> N 1 <sup>st</sup> Aid <input type="checkbox"/> Clinic <input type="checkbox"/> Hospital <input type="checkbox"/>	4) Was a "Competent Person" required? <input type="checkbox"/> Y <input type="checkbox"/> N Type:
5) Were there any near misses? <input type="checkbox"/> Y <input type="checkbox"/> N Brief Description:	6) Was PPE up or down graded today? <input type="checkbox"/> Y <input type="checkbox"/> N Changed to:

SECTION 9 QUALITY CONTROL DATA	
1) Were QC inspections held? <input type="checkbox"/> Y <input type="checkbox"/> N Site <input type="checkbox"/> MEC <input type="checkbox"/> DGM <input type="checkbox"/> Other <input type="checkbox"/>	2) Was a QA submittal made today? <input type="checkbox"/> Y <input type="checkbox"/> N Submitted by:
3) Were there any failures? <input type="checkbox"/> Y <input type="checkbox"/> N Minor <input type="checkbox"/> Major <input type="checkbox"/> Critical <input type="checkbox"/>	4) Was a Stop Work or CAR issued? <input type="checkbox"/> Y <input type="checkbox"/> N Issued by:
5) Were there any corrections? <input type="checkbox"/> Y <input type="checkbox"/> N Brief Description:	6) Was a Form 948 issued? <input type="checkbox"/> Y <input type="checkbox"/> N Issued for:

SECTION 10 MPPEH / MDAS	
No. of MPPEH items found.	Lbs. of MDAS recovered.
No. of MPPEH items consolidated.	Lbs. of MDAS placed in a "sealed" container.

SECTION 11 MEC / UXO SUMMARY					
Type:	Quantity:	Live:	Practice:	Unknown:	Location:
Projectiles					
Grenades					
Rockets					
Bombs					
Mines					
Missiles					
Pyrotechnics					
ICM / Submunitions					

SECTION 12 DEMOLITION OPERATIONS		
Location:	No. of Items Destroyed:	Remarks:

SECTION 13		DAILY COMMENTS	
CUSTOMER/REGULATORY INSTRUCTIONS ISSUED:			
SECTION 14		SIGNATURE BLOCKS	
Type or Print SUXOS Name:	Signature:	Date:	
Type or Print Site Manager's Name:	Signature	Date:	
CC to:			
Government Representative <input type="checkbox"/>	Project Manager <input type="checkbox"/>	Customer Representative <input type="checkbox"/>	
Other – Specify:			

**Note:** Sections 2 through 13 above may have additional information found in inspection forms, preprinted forms, information sheets, or tabulated data sets (i. e., Sign-In / Sign-out Log, MEC Summary Log, Demolitions Records, QC Inspection Form, Safety Inspection Form). Attach additional information or continuation sheets to this report as needed.



SL		<b>PREVIOUS EDITION MAY BE USED</b>
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**DEFICIENCY NOTICE**  
PROJECT: \_\_\_\_\_

RESPONSIBLE ORGANIZATION: \_\_\_\_\_ D.N. No. \_\_\_\_\_  
DEFICIENT CONDITION \_\_\_\_\_ DATE \_\_\_\_\_  
LOCATION \_\_\_\_\_

**I. DESCRIBE DEFICIENCY:**

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QC Notification Required Prior to Initiating Corrective Action: Yes \_\_\_\_\_ No \_\_\_\_\_

D.N. Prepared by: \_\_\_\_\_ Approved by: \_\_\_\_\_

SITE QC REPRESENTATIVE

**II. CORRECTIVE ACTION:**

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ORGANIZATION

SIGNATURE

DATE

**III. REINSPECTION**

**Results:**

\_\_\_\_\_ Accept

\_\_\_\_\_ Reject - Reissue Under: D.N. No. \_\_\_\_\_

INSPECTOR

DATE

SITE QC REPRESENTATIVE

DATE

**IV. DISTRIBUTION**

Responsible Organization: \_\_\_\_\_ Program QC Manager: \_\_\_\_\_

Site Superintendent: \_\_\_\_\_ Project/TO Manager: \_\_\_\_\_

Program Manager: \_\_\_\_\_



**PROJECT:** \_\_\_\_\_

**DEFICIENCY NOTICE LOG**

D.N. NO.	DESCRIPTION OF DISCREPANCY	ISSUE DATE	DATE CLOSED	REMARKS



<b>MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)</b> <i>(Read Instructions before completing this form.)</i>											
<b>This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.</b>				<b>1. GOVERNMENT BILL OF LADING/TRANSPORTATION CONTROL NUMBER</b>							
SECTION 1 - DOCUMENTATION				ORIGIN a.				DESTINATION b.			
2. CARRIER/GOVERNMENT ORGANIZATION											
3. DATE/TIME OF INSPECTION											
4. LOCATION OF INSPECTION											
5. OPERATOR(S) NAME(S)											
6. OPERATOR(S) LICENSE NUMBER(S)											
7. MEDICAL EXAMINER'S CERTIFICATE*											
8. <i>(X if satisfactory at origin)</i>								<b>9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*</b>			
a. MILITARY HAZMAT ENDORSEMENT				d. ERG OR EQUIVALENT COMMERCIAL:		YES		NO			
b. VALID LEASE*				e. DRIVER'S VEHICLE INSPECTION REPORT*				a. TRUCK/TRACTOR		YES NO	
c. ROUTE PLAN				f. COPY OF 49 CFR PART 397				b. TRAILER		YES NO	
<b>SECTION 11 - MECHANICAL INSPECTION</b> <i>All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.</i>											
10. TYPE OF VEHICLE(S)						11. VEHICLE NUMBER(S)					
12. PART INSPECTED <i>(X as applicable)</i>		ORIGIN (1)		DESTINATION (2)		ORIGIN (1)		DESTINATION (2)		COMMENTS (3)	
		SAT	UNSAT	SAT	UNSAT	SAT	UNSAT	SAT	UNSAT		
a. SPARE ELECTRICAL FUSES						k. EXHAUST SYSTEM					
b. HORN OPERATIVE						l. BRAKE SYSTEM*					
c. STEERING SYSTEM						m. SUSPENSION					
d. WINDSHIELD/WIPERS						n. COUPLING DEVICES					
e. MIRRORS						o. CARGO SPACE					
f. WARNING EQUIPMENT						p. LANDING GEAR*					
g. FIRE EXTINGUISHER*						q. TIRES, WHEELS, RIMS					
h. ELECTRICAL WIRING						r. TAILGATE/DOORS*					
i. LIGHTS AND REFLECTORS						s. TARPULIN*					
j. FUEL SYSTEM*						t. OTHER (Specify)					
13. INSPECTION RESULTS (X one) ACCEPTED						REJECTED					
<i>(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)</i>											
14. SATELLITE MOTOR SURVEILLANCE SYSTEM: (X one) ACCEPTED						REJECTED					
15. REMARKS											
16. INSPECTOR SIGNATURE (Origin)						17. INSPECTOR SIGNATURE (Destination)					
<b>SECTION III - POST LOADING INSPECTION</b> This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.											
		ORIGIN (1)		DESTINATION (2)		COMMENTS (3)					
		SAT	UNSAT	SAT	UNSAT						
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR											
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT											
20. SEALS APPLIED TO CLOSED VEHICLE; TARPULIN APPLIED ON OPEN EQUIPMENT											
21. PROPER PLACARDS APPLIED											
22. SHIPPING PAPERS/DD FORM 836 FOR GOVERNMENT VEHICLE SHIPMENTS											
23. COPY OF DID FORM 626 FOR DRIVER											
24. SHIPPED UNDER DOT EXEMPTION 868											
25. INSPECTOR SIGNATURE (Origin)						26. DRIVER(S) SIGNATURE (Origin)					
27. INSPECTOR SIGNATURE (Destination)						28. DRIVER(S) SIGNATURE (Destination)					

## INSTRUCTIONS

### SECTION I - DOCUMENTATION

#### General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (\*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW Part 383.

Item 7. \*Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. APPLIES TO MILITARY OPERATORS ONLY. Military Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials.

b. \*Valid Lease. Shipper will ensure a copy of the appropriate contract of lease is carried in all leased vehicles and is available for inspection. (Defense Transportation Regulation (DTR) requirement.)

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. \*Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper may provide a copy to operator.

Item 9. \*Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection.

### SECTION 11 - MECHANICAL INSPECTION

#### General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (\*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

#### SECTION 11 (Continued)

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with two serviceable fire extinguishers with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher(s) must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28, 393.32, 393.33)

## INSTRUCTIONS

### SECTION 11 (Continued)

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83 and 396 Appendix G)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83 and 396 Appendix G)

1. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 396 Appendix G)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 396 Appendix G)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFT 396 Appendix G)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 177.815(e)(1) and 398.94)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled, adequately lubricated and properly mounted.

### SECTION 11 (Continued)

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 396 Appendix G)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. Shipper will instruct the driver to send a "test" emergency message to DTTS by having the driver activate the "emergency (panic) button". Shipper will contact DTTS at 1-800-826-0794 to verify that test message was received. Message must be received by DTTS for system to be considered operational.

## SECTION III - POST LOADING INSPECTION

### General Instructions.

All items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment; fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR Part 172 Subpart F.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR Part 172 Subpart C. For shipments transported by Government vehicle, shipping paper will be DD Form 836.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Exemption 868, ensure that shipping papers are properly annotated and copy of Exemption 868 is with shipping papers.





## EMERGENCY NOTIFICATION INFORMATION

Employee's Name: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

### IN CASE OF EMERGENCY, PLEASE NOTIFY:

Name: \_\_\_\_\_ Relationship: \_\_\_\_\_

Telephone: (\_\_\_\_) \_\_\_\_ - \_\_\_\_ or (\_\_\_\_) \_\_\_\_ - \_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

### AND / OR

Name: \_\_\_\_\_ Relationship: \_\_\_\_\_

Telephone: (\_\_\_\_) \_\_\_\_ - \_\_\_\_ or (\_\_\_\_) \_\_\_\_ - \_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Additional Information: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Employee Signature: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

**DO NOT RELEASE INFORMATION TO A 3<sup>RD</sup> PARTY.**



## EMPLOYEE EMERGENCY INFORMATION

Employee's Name: \_\_\_\_\_

Date of Birth: \_\_\_\_/\_\_\_\_/\_\_\_\_

SSN: \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Blood Type: \_\_\_\_\_

**Allergic To:** \_\_\_\_\_

\_\_\_\_\_

**Current Medications:** \_\_\_\_\_

\_\_\_\_\_

**Medical Conditions:** \_\_\_\_\_

\_\_\_\_\_

Local Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone : (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ or (\_\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Employee Signature: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Reviewed or Updated On: \_\_\_\_/\_\_\_\_/\_\_\_\_

**DO NOT RELEASE THIS INFORMATION TO ANY 3<sup>RD</sup> PARTY.**



## EXPLOSIVES USAGE RECORD

Team Number:			Date:				Contract Number:		
Team Leader:			Work Area/Grid Number:				Project Name:		
Explosives	Lot Number	Quantities						Signatures	
		<i>Issued</i>	<i>Initials</i>	<i>Used</i>	<i>Initials</i>	<i>Returned</i>	<i>Initials</i>	<i>Team Leader</i>	<i>Checker</i>

Reviewed and Accepted: \_\_\_\_\_  
Senior UXO Supervisor

Date: \_\_\_\_\_



**FIELD CHANGE REQUEST FORM**

<b>Date:</b>	<b>Department:</b>	<b>Name:</b>		
<b>Change or Revision:</b>	<b>Plan/Procedure/SOP Name or #:</b>			
<b>Site Location:</b>				
<b>Preliminary Information</b>				
<b>Current Document</b>	<b>Check All That Apply</b>	<b>Supporting Documentation (List document, page, para. etc.)</b>	<b>Submitted By (Initials)</b>	<b>Reviewed By (Initials)</b>
Change or Revision Due To:				
1. Regulatory Update	<input type="checkbox"/>			
2. Contract Requirement	<input type="checkbox"/>			
3. Equipment Change	<input type="checkbox"/>			
4. Newly Identified				
a) Safety Hazard	<input type="checkbox"/>			
b) QC Measure	<input type="checkbox"/>			
c) Operational Issue	<input type="checkbox"/>			
5. Other:	<input type="checkbox"/>			
<b>Summary of Change or Revision:</b> (Identify procedural, contractual, equipment, or operator and how this affects the current SOP):				
<b>Change or Revision Requested:</b> (Identify page, para, figure, table, etc. that is changed or revised)				
<b>Requestor's Signature:</b>				
<b>Change or Revision:</b> <input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <b>Reason for Rejection –</b>		<b>Reviewer's Signature:</b>		
		<b>Safety/QC Signature:</b>		
<b>Corporate:</b> <input type="checkbox"/> Concurrence <input type="checkbox"/> Non-Concurrence		<b>Corporate Approval Signature:</b>		
<b>NTR Acknowledgement (Name)</b>		<b>NTR Signature</b>		
<b>RPM (Name)</b>		<b>RPM Signature</b>		





## GRID QC INSPECTION RECORD

Site/Location:

Date:

Grid Number:

Inspected By:

Start Time: ☐ AM ☐ PM

Stop Time ☐ AM ☐ PM

Personnel			QC Results		
Position	Name	Hours	Item	Yes / No	Quantity
QC Officer			MEC Found	<input type="checkbox"/> / <input type="checkbox"/>	
UXO Tech III			Anomalies	<input type="checkbox"/> / <input type="checkbox"/>	
UXO Tech II					
UXO Tech I			Pass Insp.	<input type="checkbox"/> / <input type="checkbox"/>	
				<input type="checkbox"/> / <input type="checkbox"/>	
				<input type="checkbox"/> / <input type="checkbox"/>	
				<input type="checkbox"/> / <input type="checkbox"/>	
Remarks:					

Draw the approximate location of items that were answered Yes in QC Results.


SW CORNER OF GRID

QC Specialist Signature \_\_\_\_\_



## MANUAL GRID RECORD

Date:	Project:	Grid Number:	
Supervisor Name:		Type of Operation:	
Sensor Used:		Number of Personnel:	
Start Time:	: <input type="checkbox"/> AM <input type="checkbox"/> PM	# Anomalies:	
Stop Time	: <input type="checkbox"/> AM <input type="checkbox"/> PM	# MEC:	

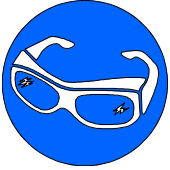



 SW Corner of Grid

# Digs \_\_\_\_\_ lbs MD \_\_\_\_\_ lbs scrap \_\_\_\_\_

Remarks:

TL/Supervisor Signature: \_\_\_\_\_



I am reviewing (check the appropriate box):	<input type="checkbox"/> A worksite	Specify location:			
	<input type="checkbox"/> A single employee's job description	Name of employee:			
		Working title of position:			
	<input type="checkbox"/> A job description for a class of employees	Position Number:			
		Working title of positions:			
		Position Number(s):			
Your name:		DEPARTMENT:		Date:	
	<b>EYE HAZARDS (Appendix B).</b> Tasks that can cause eye injury include: working with chemicals or acids; chipping, sanding, or grinding; welding; furnace operations; and, metal and wood working.				
	Check the appropriate box for each hazard:			Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Chemical Exposure	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	High Heat/Cold	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Dust/Flying Debris	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Impact	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Light/Radiation	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	<b>HEAD HAZARDS (Appendix C).</b> Tasks that can cause head injury include: working below other workers who are using tools or materials that could fall; working on energized electrical equipment or utilities; and, working in trenches or confined spaces.				
	Check the appropriate box for each hazard:			Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Impact	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Electrical Shock	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	<b>FOOT HAZARDS (Appendix D).</b> Tasks that can cause foot injury include: exposure to chemicals or acids; welding or cutting; foundry operations; materials handling; renovation or construction; electrical work; and, spray finishing or other work with flammable or explosive materials.				
	Check the appropriate box for each hazard:			Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Chemical Exposure	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	High Heat/Cold	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Impact/Compression	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Slips/Trips	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Puncture	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Slippery/Wet Surfaces	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Explosive/Flammable Atmospheres	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	Electrical	Yes <input type="checkbox"/>	No <input type="checkbox"/>		

	<b>HAND HAZARDS (Appendix E).</b> Hand injury can be caused by: work with chemicals or acids; exposure to cut or abrasion hazards (for example, during demolition, renovation, or woodworking); and, work with very hot or cold objects or materials. <b>BLOODBORNE PATHOGENS – ADDITIONAL TRAINING/MONITORING IS REQUIRED!</b>		
	Check the appropriate box for each hazard:	Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Chemical Exposure      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	High Heat or Cold      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Cuts/Abrasion      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Puncture      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Electrical Shock      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Bloodborne Pathogens      Yes <input type="checkbox"/> No <input type="checkbox"/> (see Appendix E)		
	<b>BODY/TORSO HAZARDS (Appendix F).</b> Injury of the body or torso occur during: exposure to chemicals, acids, or other hazardous materials; abrasive blasting; welding, cutting, brazing; chipping, sanding, or grinding; use of chainsaws or similar equipment; foundry operations; and, work around electrical arcs.		
	Check the appropriate box for each hazard:	Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Chemical Exposure      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Extreme Heat/Cold      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Abrasion      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Impact      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Electrical Arc      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	<b>FALL HAZARDS (Appendix G).</b> Personnel may be exposed to fall hazards when performing work on a surface with an unprotected side or edge that is 6 feet or more above a lower level, or 10 feet or more on scaffolds. Fall protection may also be required when using vehicle manlifts, elevated platforms, tree trimming, performing work on poles, roofs, or fixed ladders. <b>ADDITIONAL TRAINING/MONITORING IS REQUIRED!</b>		
	Check the appropriate box for each hazard:	Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Fall hazard      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	<b>NOISE HAZARDS (Appendix G).</b> Personnel may be exposed to noise hazards when machining, grinding, sanding, using pneumatic equipment, generators, motors, jackhammers, or similar equipment. <b>ADDITIONAL TRAINING/MONITORING IS REQUIRED!</b>		
	Check the appropriate box for each hazard:	Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Noise hazard      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	<b>RESPIRATORY HAZARDS (Appendix G).</b> Personnel may be exposed to respiratory hazards that require the use of respirators: when using certain chemicals outside of chemical fume hood; when applying paints or chemicals in confined spaces; when welding, cutting, or brazing on certain metals; and, when disturbing asbestos, lead, silica, or other particulate hazards. <b>ADDITIONAL TRAINING/MONITORING IS REQUIRED!</b>		
	Check the appropriate box for each hazard:	Description of hazard(s):	Based upon the hazard assessment, the following PPE is required:
	Chemical exposure      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Confined space work      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Particulate exposure      Yes <input type="checkbox"/> No <input type="checkbox"/>		
	Welding/related hazard      Yes <input type="checkbox"/> No <input type="checkbox"/>		

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on this date (signature)

\_\_\_\_\_

**SURVEYOR(S):**

037 USA Form  
Original: March 2011





## HEAT STRESS MONITORING LOG

Date:  
UXOSO:

Site Name:  
Location:

Conditions:

Name	Organization	Start Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate	Time	Pulse Rate

Remarks:



**MDAS ACCUMULATION FORM FOR DRUM/CONTAINER NO.**

Date	Description/NIIN	Qty (lb)	Type of Treatment*

**\*If applicable**

"The material listed on this form has been inspected or processed by DDESB-approved means, as required by DoD policy, and to the best of my knowledge and belief does not pose an explosive hazard."

**CERTIFIER:**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Printed Name \_\_\_\_\_

Position \_\_\_\_\_

Organization Name \_\_\_\_\_

Organization Address \_\_\_\_\_

Organization Phone Number \_\_\_\_\_

**VERIFIER:**

Signature \_\_\_\_\_ Date \_\_\_\_\_

Printed Name \_\_\_\_\_

Position \_\_\_\_\_

Organization Name \_\_\_\_\_

Organization Address, \_\_\_\_\_

Organization Phone Number \_\_\_\_\_



[illegible]



## Operator & Geophysical Instrument Checkout Form for MEC Operations

WEEK START DATE:	Team No.:	Instrument Serial No.: USA: Schonstedt:
Operator Name:		
SITE NAME AND LOCATION:		
Instrument Verification Strip:		
Test Plot Area (List by grid number, lane, marker number, or other identifier): (8) Items: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <u>#1.</u> Test Strip Start Rebar / Vertical / Depth Flush.  <u>#2.</u>  <u>#3.</u>  <u>#4.</u> </div> <div style="width: 45%;"> <u>#5.</u>  <u>#6.</u>  <u>#7.</u>  <u>#8</u> Test Strip End Rebar / Vertical / Depth Flush           </div> </div>		
Test Results (Pass)	MON	TUE
Item Description	PASS	PASS
1. Instrument checked For Broken/ Missing Components.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
2. Instrument Serviceability Check Performed.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
3. Correct Settings Selected for the Instrument.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
4. Correct Survey / Sweep Techniques Employed.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
5. Instrument Responsive To The Test Item(s)	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
6. Operator Responsive to Instrument Signal / Sound.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
7. Operator Locates Point of Origin For Test Item(s).	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
8. Operator familiar with Pass / Fail Criteria.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
9. Operator Familiar with Work Plan Procedures.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
10. Instrument Trained Operator.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
11. Instrument Passed Test Area.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
12. Operator Passed Test Area.	Y <input type="checkbox"/> / N <input type="checkbox"/>	Y <input type="checkbox"/> / N <input type="checkbox"/>
SUMMARY OF DEFICIENCIES NOTED: (Identify if procedural, process, instrument, or operator, number missed)		
CORRECTIVE ACTIONS RECOMMENDED: (If required):		
<ul style="list-style-type: none"> <li>Instruments failing the test will be tagged and removed from service until repaired or replaced.</li> <li>Individuals will be corrected on deficient procedures, processes, techniques, and/or retrained to acceptable standards.</li> </ul>		
Team Leader Signature: _____ End of Week Date: _____		

**NOTE:** Quality Control tests are to be conducted for the instrument and operator each day and documented on this form. This form will also be used to document the current status of deficiencies noted during daily tests. Any daily test forms where deficiencies have been noted will be forwarded to the Senior UXO Specialist / Manager or the UXO Quality Control Specialist / Manager.





**RECORD  
OF  
SAFETY VIOLATION OR NON-COMPLIANCE**

Employee Name: \_\_\_\_\_

Position: \_\_\_\_\_

Site / Location: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Type of Violation: \_\_\_\_ PPE \_\_\_\_ Procedural \_\_\_\_ Explosive \_\_\_\_ Equipment \_\_\_\_ Other

Type of Non-Compliance: \_\_\_\_ Policy \_\_\_\_ Procedural \_\_\_\_ Directive \_\_\_\_ Contract  
\_\_\_\_ Other

Description of Violation or Non-Compliance:

\_\_\_\_\_

\_\_\_\_\_

Document Reference ( Specify document, page, paragraph, etc. as applicable ):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Corrective Action(s) to be taken:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Employee or Company Response and Comments:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Notification made to:

Manager: \_\_\_\_ Yes \_\_\_\_ No

Date:

SUXOS: \_\_\_\_ Yes \_\_\_\_ No

Date:

Supervisor: \_\_\_\_ Yes \_\_\_\_ No

Date:

Corrective Actions Inspection Required: \_\_\_\_ Yes \_\_\_\_ No

If Yes, Date of Inspection: \_\_\_\_/\_\_\_\_/\_\_\_\_

Signature: \_\_\_\_\_  
Safety Officer

Signature: \_\_\_\_\_  
Employee/Company Representative



**USAE**  
**Safety Inspection Form**  
**FOR MEC OPERATIONS**

<b>DATE:</b>	<b>TIME:</b>	<b>LOG NO.:</b>	
<b>CONTRACT NO.:</b>		<b>TASK ORDER NO.:</b>	
<b>SITE NAME AND LOCATION:</b>			
<b>TEAM OR NAME OF INSPECTED:</b>			
<b>INSPECTED ITEMS OR OPERATIONS:</b> (List by task, item or other specific identifier)			
<b>II. INSPECTION RESULTS</b>			
Item Description	Pass	Item Description	Pass
1. PPE ( A, B,C,D)	Y / N	9. MEC/UXO Disposal Operations:	Y / N
2. Compliance with Approved SOP's	Y / N	10. Motor Vehicles / MHE Inspections	Y / N
3. Compliance with Approved Safety Plans	Y / N	11. First Aid / Trauma Kit:	Y / N
4. Safety / Support Equipment	Y / N	12. Other (list):	Y / N
5. On- and Off-Site Communications	Y / N	13. Other (list):	Y / N
6. Explosives / Ordnance Reference Material	Y / N	14. Other (list):	Y / N
7. MSDSs and Container Labeling per APP or SOP	Y / N	15. Other (list):	Y / N
8 MEC/UXO Precautions Observed	Y / N	16. Other (list):	Y / N
<b>SUMMARY OF DEFICIENCIES NOTED:</b> (If Required)			
<b>CORRECTIVE ACTIONS RECOMMENDED:</b> (If required)			
<b>REINSPECTION RESULTS:</b> (If required)			
<b>VI. SIGNATURES:</b>		I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary)	
_____		_____	
UXOSO / SSO		Sr. UXO Supervisor / Site Manager	

Note: Safety Inspections are to be conducted each day and documented on this form. This form will also be used to document the present status of the site/site operations, personnel, and will also be used to note the current status of deficiencies noted during daily inspections. Any daily inspection forms where deficiencies have been noted will be forwarded to the Site Manager/SUXOS and a CC to the USAE Safety Manager.



## SAFETY INSPECTION REPORT

<b>Site / Location:</b>	<b>Date:</b>
<b>Type of Inspection:</b> <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Re-Inspection <input type="checkbox"/> Other	
<b>Type of Operation Inspected:</b>   	
<b>Equipment Inspected (Specify if Safety or Operational in Nature):</b>   	
<b>Comments:</b>    	
<b>Deficiencies Found or Noted:</b>    	
<b>Corrective Action:</b>    	
<b>Re-Inspection Required:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No	<b>If Yes, Date of Re-Inspection:</b>

**Signatures:**

\_\_\_\_\_  
**Site Safety Officer**

\_\_\_\_\_  
**SUXOS/Project Manager**

**\*Copy to Supervisor if Deficiencies or Corrective Action were found, noted, or deemed necessary.**



☐ PM



3. Topics Covered (Check all that apply)			
<input type="checkbox"/>	Site Safety Personnel	<input type="checkbox"/>	Decontamination Procedures
<input type="checkbox"/>	Site/Work Area Description	<input type="checkbox"/>	Emergency Response Plan
<input type="checkbox"/>	Site Characterization	<input type="checkbox"/>	Hazard Communication
<input type="checkbox"/>	Biological Hazard(s)	<input type="checkbox"/>	On-Site Emergency
<input type="checkbox"/>	Chemical Hazard(s)	<input type="checkbox"/>	On-Site Injuries/Illnesses
<input type="checkbox"/>	Physical Hazard(s)	<input type="checkbox"/>	Evacuation Procedures
<input type="checkbox"/>	Heat Stress	<input type="checkbox"/>	Rally Point(s)
<input type="checkbox"/>	Cold Stress	<input type="checkbox"/>	Emergency Communication
<input type="checkbox"/>	Site Control	<input type="checkbox"/>	Directions to Medical Facility
<input type="checkbox"/>	Work and Support Zones	<input type="checkbox"/>	Drug and Alcohol Policies
<input type="checkbox"/>	PPE	<input type="checkbox"/>	Medical Monitoring Program
<input type="checkbox"/>	Air monitoring	<input type="checkbox"/>	Specific Task Training
<input type="checkbox"/>	Safe Work Practices	<input type="checkbox"/>	Confined Spaces
<input type="checkbox"/>	Engineering Controls and Equipment	<input type="checkbox"/>	Heavy Equipment
<input type="checkbox"/>	Spill Containment Procedures	<input type="checkbox"/>	Other: (Specify)

<b>4. Remarks:</b>
--------------------

**5. Verification:**

*I certify that the personnel listed above on this record received the Information and/or Training described as indicated. Personnel not attending this meeting/training will receive said information/training prior to commencing their assigned duties.*

\_\_\_\_\_  
**Site Safety Officer - Signature**

\_\_\_\_\_  
**Date:**

## SITE VISITORS LOG

Project Location: \_\_\_\_\_

Month of: \_\_\_\_\_

Date	Name	Agency or Company	Purpose of Visit	Safety Briefing	Escort Required	Time In	Time Out	Remarks



**TAILGATE SAFETY BRIEFING**

Date:

Location:

Time:

☐ AM ☐ PM

Team #:

<b>1. Reason for Briefing:</b>			
<input type="checkbox"/>	Daily Safety Briefing	<input type="checkbox"/>	New Site Procedure
<input type="checkbox"/>	Initial Safety Briefing	<input type="checkbox"/>	New Site Information
<input type="checkbox"/>	New Task Briefing	<input type="checkbox"/>	Review of Site Information
<input type="checkbox"/>	Periodic Safety Meeting	<input type="checkbox"/>	Other (Specify):
<b>2. Personnel Attending:</b>			
Name		Signature	Position
<b>3. Briefing Given By:</b>			
Name		Signature	Position
<b>4. Topics: ( Check All That Apply )</b>			
<input type="checkbox"/>	Site Safety Personnel	<input type="checkbox"/>	Decontamination Procedures
<input type="checkbox"/>	Site/Work Area Description	<input type="checkbox"/>	Emergency Response/Equipment
<input type="checkbox"/>	Physical Hazards	<input type="checkbox"/>	On-Site Injuries/Illnesses
<input type="checkbox"/>	Chemical/Biological Hazards	<input type="checkbox"/>	Reporting Procedures
<input type="checkbox"/>	Heat/Cold Stress	<input type="checkbox"/>	Directions to Medical Facility
<input type="checkbox"/>	Work/Support Zones	<input type="checkbox"/>	Drug and Alcohol Policies
<input type="checkbox"/>	PPE	<input type="checkbox"/>	Medical Monitoring
<input type="checkbox"/>	Safe Work Practices	<input type="checkbox"/>	Evacuation/Egress Procedures
<input type="checkbox"/>	Air Monitoring	<input type="checkbox"/>	Communications
<input type="checkbox"/>	Task Training	<input type="checkbox"/>	Confined Spaces
<input type="checkbox"/>	MEC Precautions	<input type="checkbox"/>	Other:
<b>5. Remarks:</b>			



**WEEKLY QUALITY CONTROL REPORT****CONTRACT WITH DELIVERY ORDER:****SITE:****DATE:****USA MOBILE PHONE:****USA SITE OFFICE PHONE:****REPORT SUBMITTED BY:****WEEK ENDING DATE:****PROJECT SCHEDULE:****INSPECTIONS CONDUCTED (See Internal Audit List):**

<b>WEEKDAY</b>	<b>Inspection Areas</b>						
	QCI of Overall Site	QCI of Teams	SHI of Overall Site	SHI of Teams	Explosives Storage	QCI of Administration	QCI of DGM
Sunday							
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							

QCI = Quality Control Inspection      SHI = Safety and Health Inspection  
**See Separate Inspection Forms for the Task Checked.**

**ADMINISTRATIVE: Personnel On-Site**

<b>WEEKDAY</b>	<b>USA</b>		<b>Subcontractors</b>		<b>Total</b>		<b>Visitor</b>	<b>Gov't</b>
	Assigned	Present	Assigned	Present	Assigned	Present	Present	Present
Sunday								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								

**NOTICE OR NONCONFORMANCE REPORT ISSUED:**

<b>WEEKDAY</b>	<b>Subject Items</b>					<b>Response</b>	
	Work Plan	Safety Violation	Safety Comment	Quality Control	Other	Action Required and Date	Responsible Party Initials
Sunday							
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							

**See Report for Specific Information and Response.**

**OPERATIONS:**

<b>SITE OPERATIONS (WORKING)</b>													
<b>Grids</b>		<b>Vegetation</b>		<b>OB/OD Areas</b>		<b>GEO</b>		<b>Survey</b>		<b>Trench/Excavations</b>		<b>Other</b>	

<b>QUALITY CONTROL INSPECTION (PASS / FAIL)</b>													
<b>Grids</b>		<b>Vegetation</b>		<b>OB/OD Areas</b>		<b>GEO</b>		<b>Survey</b>		<b>Trench/Excavations</b>		<b>Other</b>	

**See Grid / Area Inspection Forms for Location and Additional Information to include Blind Seed Items (BSI)**

<b>PERCENTAGES COMPLETE</b>													
<b>Grids</b>		<b>Vegetation</b>		<b>OB/OD Areas</b>		<b>GEO</b>		<b>Survey</b>		<b>Trench/Excavations</b>		<b>Other</b>	

<b>OPERATIONAL HEAVY EQUIPMENT ON-SITE</b>													
<b>Track-hoe</b>		<b>Bulldozer</b>		<b>Front-end Loader</b>		<b>Back-hoe</b>		<b>Bob-cat</b>		<b>Forklift</b>		<b>Crane</b>	

<b>NON- OPERATIONAL HEAVY EQUIPMENT</b>													
<b>Track-hoe</b>		<b>Bulldozer</b>		<b>Front-end Loader</b>		<b>Back-hoe</b>		<b>Bob-cat</b>		<b>Forklift</b>		<b>Crane</b>	

**INSTRUMENTATION:**

DGM Instrumentation						
Display	Battery	Cables	Connections	Warm Up	Cable Shake	Operator

Hand Held Instruments						
Hand Held	Operational	Functions	Settings	Test Strip	BSI	Operator

Global Positioning Systems						
Display	Battery	Cables	Connections	Warm Up	Tracking	Operator

GPO / Test Strip						
Munitions	Scrap	CD	BSI	Depth	Known	Operator

Monuments or Benchmarks						

**WEEKLY EXPLOSIVES USAGE:**

WEEKDAY	Explosives		Blasting Caps		Tube / Cord		Other	
	Boosters	Perforators	Elect Caps	Non-Elect Caps	Non-EL	Det Cord	Time Fuse	
Sunday								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								
<b>TOTAL:</b>								

**See Explosive Issue / Usage Form and Magazine Data Cards for Accountability and Signatures.**

**WEEKLY INVENTORY:**

DATE OF INVENTORY	Explosives		Blasting Caps		Tube / Cord		Other	
	Boosters	Perforators	Elect Caps	Non-Elect Caps	Non-EL	Det Cord	Time Fuse	

**See Explosive Issue / Usage Form and Magazine Data Cards for Accountability and Signatures.**



**SAFETY: Reported Work Related Injuries/Illness On-Site**

WEEKDAY	USA						Subcontractor						Total					
	LWD		Restricted		Other		LWD		Restricted		Other		L		R		O	
	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL	INJ	ILL
Sunday																		
Monday																		
Tuesday																		
Wednesday																		
Thursday																		
Friday																		
Saturday																		
See Individual Accident / Incident Reports for Specific Information.																		

**DOWN TIME:**

WEEKDAY	Time		Time		Time		Total Hours	Remarks
	From	To	From	To	From	To		
Sunday								
Monday								
Tuesday								
Wednesday								
Thursday								
Friday								
Saturday								
See Operations Reports / Logs for Specific Information.								

**GENERAL OBSERVATIONS:****DIRECTIVES OR CHANGES TO OPERATIONS:****LESSONS LEARNED:**

UXOQCS Signature: \_\_\_\_\_

**DISTRIBUTION:**

- 1 - Site Manager/SUXOS
- 1 - Corporate QC Manager
- 1 - Site QC File

#### **APPENDIX D. ADDITIONAL SUPPORTING INFORMATION**

This appendix contains the following supporting information, which is provided for clarification:

1. Geophysical System Verification (GSV) Process Description.
2. Standard protocol for discovery in the field of potential items of environmental concern.

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## D.1 GEOPHYSICAL SYSTEM VERIFICATION (GSV) PROCESS DESCRIPTION

The Geophysical System Verification (GSV) method will be implemented at Site 12 in order to verify the geophysical equipment is operating properly, and to evaluate the target selection process. The GSV method will show that the equipment is functioning properly by using measurement performance criteria, which are similar to data quality objectives (DQOs), in that they state minimum requirements that the geophysical data must pass. The components of the GSV method and additional quality control measures, as they are applied to data collected at Site 12, are described here in addition to the information provided in worksheet 12 of the MEC Remedial Investigation WP (UFP QAPP).

### GSV Method

The first step in implementing the GSV method is to install an instrument verification strip (IVS). The IVS for this investigation will consist of three parallel lines 30 m in length and will contain 6 Industry Standard Objects (ISOs) which will be buried at various depths. It will be constructed such that each EM61-MK2 coil in the three coil array will pass over two small ISOs with a single pass. Details on how the ISOs are buried are summarized in the table below. The three lines will be parallel and separated by 1 meter to allow the three coils of the EM61-MK2 towed array to pass directly over all ISOs with a single pass. When testing an individual EM61-MK2 over the IVS, only the center line will be used. Each ISO will be oriented horizontally and in-line with the direction of data collection along the IVS. The along-line location of the ISO may be modified due to obstructions, terrain, or other site conditions found during construction of the IVS. Following burial, the center point of each seed item will be surveyed using real-time kinematic (RTK) GPS capable of centimeter accuracy.

Item ID	Line	Down Line Distance (m)	Burial Depth <sup>(1)</sup> (m)
ISO-1	1	2	0.10 (3 x OD)
ISO-2		17	0.23 (7 x OD)
ISO-3	2	7	0.10 (3 x OD)
ISO-4		22	0.23 (7 x OD)
ISO-5	3	12	0.10 (3 x OD)
ISO-6		27	0.23 (7 x OD)

(1) Depth measured from ground surface to the center of the ISO.

A “noise strip” located adjacent to the IVS will be used to determine the background noise level of the EM61-MK2s. The noise strip will contain no discreet anomalies or buried ISOs and will consist of three straight, well-defined lanes equal in length to the adjacent IVS. The noise level will be defined as the standard deviation of the sensor readings recorded along the noise strip.

The IVS is used for testing equipment twice daily (once before data is collected and again at the end of the day). After the IVS and noise lines are established they will be surveyed at least five times to determine the baseline response for each ISO. The responses from those first five IVS datasets will be averaged to determine the expected response. After the initial (or expected) responses are determined in the first five passes, during normal days of operations, the instrument operator will make a single pass over both the IVS and the adjacent noise strip. The travel path over each strip will be well marked to ensure that the instrument passes directly over the center of each ISO and that background data are collected in a consistent manner from day to day.

When the equipment is surveyed over the IVS, the anomalies generated from passing over the ISOs are analyzed by a processing geophysicist. The measurement performance criteria requires that the magnitude of each anomaly must be a minimum of 75% of the expected response for the specific ISO. The expected response is produced during the initial data collected at the IVS, thus the IVS will test quality and consistency of the geophysical data.

Another key aspect of the GSV approach is the blind seeding program. The seeds used at Site 12 consist of small ISOs buried at a depth of 10 cm with enough spread throughout the site such that 1 seed should be encountered during each full day of geophysical surveying. The locations of the seed items will be kept by the QC geophysicist who will not share the locations with those making targets selections until after they have been compared to the measurement performance criteria. The measurement performance criteria for blind seeding is that the blind seed items must be recorded at a minimum of 75% of the expected response level, and the location of the target is within 85 cm of the known location. Thus the blind seeding program is designed to act as a continuous QC check of the data quality, target selection process, as well as the intrusive investigation procedures.

<b>Type of Functionality Test</b>	<b>Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>
Instrument Verification Strip (IVS)	Data is collected over the IVS at the beginning and end of each day.	The anomaly response over the ISOs are at least 75% of the expected (or initial) response.
Blind Seeding Program	Small ISOs are buried throughout the site at 10 cm such that 1 should be encountered per day, and a QC geophysicist evaluates the targets selected over them.	All blind seeds are detected within at least 75% of the minimum expected response and the position of the anomaly is no more than 85 cm away from the known position of the seed.

### **Additional Quality Control Measures**

In addition to the GSV method serving to test proper functionality of the geophysical equipment, there are additional QC measures which are applied to the data. These include measurements of the data collection velocity, data point separation, and total data coverage over the site. Each of these QC measures are applied to the data collected within the Site 12 field area (rather than at the IVS) before targets are selected.

Upon the completion of a day of data collection at Site 12, the processing geophysicist will use software to calculate the amount of the data which falls within the measurement performance criteria for each of the quality control measures. The velocity maximum of 3.4 mph will ensure that small anomalies won't be missed. The density of data-points is monitored by the along-line measurement spacing requirement such that there must be consecutive data points no more than 15 cm apart within the collected data lines. Finally, the coverage over the site is monitored such that the project specific line spacing of 2.5 ft is maintained over at least 95% of the site.

Type of Functionality Test	Activity to Assess Measurement Performance	Measurement Performance Criteria
Velocity	Geophysical data processor applies Geosofts Velocity Calculation QC software to the geophysical data.	$95\% \leq 3.4$ mph (or maximum velocity demonstrated during IVS).
Along-line measurement spacing	Geophysical data processor applies Geosofts Along-Line Measurement Calculation QC software to the geophysical data.	98% of along line measurement spacings $\leq 0.25$ m
Coverage	Geophysical data processor applies Geosofts Coverage Calculation QC software to the geophysical data.	>95% coverage at project design line spacing

## D.2 STANDARD PROTOCOL FOR DISCOVERY IN THE FIELD OF POTENTIAL ITEMS OF ENVIRONMENTAL CONCERN

The focus of this work is to complete a remedial investigation of potential MEC at Site 12. However, based on the site history, this Work Plan acknowledges that there is the potential to encounter non-MEC items that pose a concern, such as drums, apparent asbestos containing material (ACM), or other items. In the event that drums, potential ACM, or other items, hereafter referred to as “an item”, are encountered at Site 12, the following procedure will be followed:

- The Navy POC will be informed that an item was encountered.
- The item will be flagged, and the team will continue work but will avoid further contact with the item.
- The item will be photographed and any observations (without moving the object) will be documented in the field log book.
- The location of the item will be noted in the log book by means including a sketch and/or GPS coordinates. The location will be demarcated in the field by placement of stakes, flags, or tape, as appropriate.
- MEDEP and USEPA will be informed that an item was encountered.
- The Navy team will discuss and determine the path forward, with support for MEDEP and USEPA. The types of steps taken may include tasks such as sampling to characterize the item, engaging qualified personnel to further characterize and move the item, disposing of the item properly, determining the need to characterize nearby soil, etc.

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## **APPENDIX E. REGULATORY REVIEW AND RESPONSE TO COMMENTS**

This appendix contains the following supporting information:

1. Cover Letter for Response to Review Comments
2. Attachment 1. Response to MEDEP review comments, dated 9 September 2013

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# ***USA Environmental, Inc.***

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16 September 2013

Naval Facilities Engineering Command, MIDLANT  
ATTN: Mr. Todd Bober  
BRAC PMO East  
4911 South Broad Street  
Philadelphia, PA 19112-1303

Subject: Site 12 MEC Remedial Investigation & Site 12 Pond Time Critical Removal Action  
Work Plan (MEC QAPP) – Response to Regulatory Review Comments

Reference: Former Naval Air Station, Brunswick, ME; Munitions Response Actions (MRA)  
Contract No. N62470-11-D-8007, CTO WE01-Mod03 & Mod04

Dear Mr. Bober:

USA Environmental, Inc. (USA) is providing the response to review comments received from the MEDEP and EPA Region 1 the week of September 9. The review comments and the responses provided are presented in Attachment 1 to this letter.

We look forward to discussing any further comments via teleconference, if possible, in order to expedite final changes to the work plan.

Please advise if you have any questions or concerns; I may be reached at 813-343-6339 or via email at RHierholzer@usatampa.com.

Sincerely,



Robert J. Hierholzer  
Project Manager

Attachment 1: Response to MEDEP Comments

## ATTACHMENT 1.

### Draft MEC Remedial Investigation WP (UFP QAPP) of Site 12 EOD Area Response to Regulatory Review

#### Response to MEDEP review comments, dated 9 September 2013

##### General Comments:

1. Please revise the title so that there are no acronyms in the title both on the title page and worksheet 1.

**Response:** *The Navy will correct these pages as requested.*

2. In order to have confidence in the results of the Digital Geophysical Mapping (DGM) a robust Geophysical Prove Out (GPO) is necessary for the selected instruments, such as recommended by Interstate Technology Regulatory Council (ITRC) guidance. A GPO of the equipment selected to perform the investigation under site specific conditions is necessary to determine and document its capability to meet the overall project goals and objectives. MEDEP suggests that objectives of the GPO out at Site 12 are to:

- Document the capabilities and limitations of each geophysical detection instrument selected for use in the remedial investigation;
- Confirm the achievable probability of detection and confidence levels or confidence intervals to support decision making at the site;
- And document system reliability.

This information needs to be added to worksheet 14 along with the specific performance standards required for the project.

**Response:** *The Environmental Security Technology Certification Program (ESTCP), working closely with the Naval Research Laboratory (NRL), has documented that the EM61-MK2 is capable of detecting the MEC items expected at the site. They have additionally replaced the historic GPO with the Physics-based Geophysical System Verification (GSV), as a more supportable method for documenting system performance at the beginning of a project, and then daily, throughout the project. The blind seeding program [which is part of the GSV along with the Instrument Verification Strip (IVS)] was designed to demonstrate that the equipment performs consistently throughout each work day. Once the threshold for the site has been chosen (5 times the noise level calculated at the IVS), we will include in the IVS letter report, as well as the NRL, calculations for maximum depth of detection for a 40mm. The following is a link to the ESTCP GSV Final Report. <http://serdp-estcp.org/Tools-and-Training/Munitions-Response/Geophysical-System-Verification>. No change to the text is required.*

3. The workplan also needs to outline the data quality objectives for the GPO including the Geophysical Survey and Anomaly Identification precision, representativeness, sensitivity, accuracy and completeness for the geophysical sensor data. For Positional Data for both anomaly identification and reacquisition, precision, accuracy and completeness DQOs need to be outlined.

**Response:** *The Positional Measurement Performance Criteria are provided in Worksheet #12. As explained in response to Comment 3, a GPO will not be conducted.*

4. Once the Digital Geophysical Mapping (DGM) is completed and evaluated MEDEP would like to see the proposal for which anomalies are to be dug along with the Navy's rationale.

**Response:** *Agreed. Clarification will be added in the Executive Summary, Worksheet #11 and Worksheet #14.*



5. According to the Standard Operating Procedure (SOP) 6 for Invasive Operations (Section 11.2, bullet 6) if any high explosive or filler is found on the soil that it will be marked and logged in the logbook. It does not state what happens after that. For example, will be removed, will the area will be sampled for soil/groundwater contamination or the excavation will be filled back in? Also SOPs for sample collection, handling, processing are also needed. Please clarify.

**Response:** *This is based on whether or not the Navy directs USA to investigate it. Assuming they do, the following will be added.*

The focus of this RI UFP QAPP/WP is the MEC investigation. Any MC sampling will be conducted in accordance with the "Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Munitions Constituents Remedial Investigation of Site 12 EOD Area, Former Naval Air Station Brunswick," prepared by Tetra Tech and dated 10/1/2012. This document will subsequently be referred to as the Site 12 MC SAP (Tetra Tech, 2012). This full reference to the document will be added to Worksheet #11, Page 34. As directed by the Navy, in the event that potential HE or other explosive filler is observed on the soil, one 6-point wheel composite soil sample per location will be collected and analyzed for explosives (SW8830B). The location of the soil sample will be flagged and the GPS coordinates will be recorded. The area will not be restored until the analytical results have been received. The results of the sample will be provided to the Navy, MEDEP, and EPA, to discuss whether additional soil characterization or soil removal is warranted. .

6. Please notify MEDEP by email at least two week prior to mobilization to the field so that MEDEP staff can be on site if schedules allow.

**Response:** *Concur. .*

7. MEDEP would like to receive weekly updates on the status of the RI and informed of any notable findings.

**Response:** *Agreed. Clarification will be provided in Worksheet #6.*

#### **Specific Comments:**

8. Section 10.5.4, Hydrogeology and Hydrology, Line 570: "The closest private drinking water wells are approximately 2,000 feet east of the site along Coombs Road."

Please determine if Route 24 and/or Princes Point Road homes are closer than Coombs Road and correct as necessary. Also if Coombs Road has the closest private drinking water wells, please check the directions from the site.

**Response:** *Coombs Road is the closest. A review of the area indicates that the residential well locations nearest to Site 12 are situated approximately 2,100 ft to the northeast on Coombs Road and approximately 2,500 ft southeast on Princes Point Road.*

9. Section 10.6.4, Potential Future Human Receptors, Lines 608 - 614: The long term goal is to transfer this property to the Town as a natural area which allows for pedestrian trails, nature and interpretive centers, summer camps, environmental educations and other non-intrusive recreations and educations uses. Under this scenario, parker users/trespassers would also need to be considered as potential receptors.

**Response:** *Section 10.6.4 to be modified to include these potential receptors.*

10. What Type of Data Is Needed, bullet 7, Lines 682 – 687: For soil removal related to detected Munitions Constituents (MC), please clarify which Sampling & Analysis Plan (SAP) is referred to here.

**Response:** *As noted in the response to Comment 5, the full reference to Tetra Tech's 2012 MC SAP that was prepared for Site 12, will be provided.*

11. How “Good” do the Data Need to Be..., Bullet 2, Line 702: Please add the limit of detection depth of the instruments for the smallest and largest item suspected to have been burned at the site.

**Response:** *Detection expectations for both the best-case orientation (vertical) and the worst-case orientation (horizontal) are documented as part of the GSV. The dynamic background root mean square (RMS) noise is established as part of the GSV. By applying a signal-to-noise multiplier (e.g., 5 times the RMS noise level), an initial anomaly selection threshold is established.*

*Because the EM61-MK2 response curves for many munitions items have been documented, applying the GSV-established anomaly selection threshold to these published curves is an appropriate means to document the expected detection depths. Thus, no change in the text is required.*

12. How Much Data Are Needed,

- a. Line708 – 709: MEDEP would like opportunity to review and comment on the development of the Decision Units prior to the selection of the number and locations of the anomalies to be investigated.

**Response:** *The Navy will provide proposed DUs and recommended dig lists for review by the Project Team.*

- b. Lines 712 – 715, & Table 11-1: Please specify the Army Corps reference and the version of Visual Sampling Plan (VSP) referred to in this paragraph. Also, the second to last sentence appears to be missing text or is unclear, please revise as needed.

**Response:** *The VSP version will be provided. This is a Military Standard production acceptance sampling tool for assessing lots (Decision Units) of production that the Army Corps of Engineers has used, and that is embedded in VSP (e.g., in order to reach a specified confidence level, how many items do you need to check?).*

13. Table 11-2, Methods of Obtaining Data, Munitions Constituents Sampling, How, Line 733: More information is necessary as much of the Site 12 SAP was for incremental sampling.

**Response:** *As noted in response to Comment 5, the focus of this subject document is the MEC RI.*

*Because MC samples are not being proposed as part of this plan, the worksheets that address MC sampling are not required. References to soil sampling have been included in this MEC RI QAPP to acknowledge that field observations during the course of the MEC RI may result in the collection of soil samples to address Site 12 conditions. Discrete sampling was conducted during the MC RI at DU2, and the Site 12 MC SAP (Tetra Tech, 2012) addresses the sampling methodology.*

14. Section 12.0, Measurement Performance Criteria, DGM Surveys, GSV blind seeding, Line 777: The detection system must be able to located the munitions items of interest so the size, shape, depth, orientation and composition of the seed items need to reflect what can be expected at the site. Please identify the size of the item to be seeded. Is 10 cm adequate (approximately 4 inches) if the conceptual site model is that kick out items have a predicted penetration depth of 12 inches? How will the shallow depth of the blind seeding affect overall accuracy? Are the blind seed positioned at different angles to ensure that even items that may be vertical will still detected?

**Response:** *The GSV report documents the expected detection depths. The use of an Industry Standard Object (ISO) as a blind seed item (BSI) ensures that the system is tested against a well documented and published response table. The BSI response is compared to the published table to document that the system is performing as designed, and that the expected detection depths, established during the GSV, are being maintained. No change in text is required.*

15. Section 14, Summary of Definable of Project Features of Work (Line 788) and Section 17.1, General Technical and Operational Approach, Lines 802 – 837:

- a. DGM Data Processing and Anomaly Selection - Will there be input from the regulatory agencies when the decision units (DUs) and the dig list are prepared? What are the planned criteria for

defining the DUs? Please reference the VSP module to be used in the initial selection of anomalies.

- b. Investigation of Subsurface Debris and Items of Environmental Concern – In the event that significant hazardous waste containers (drums of product) are found MEDEP supports deferring action to a separate scope of work unless there is an imminent threat to human health or the environment, so that the MEC clearance can be completed first.

**Response:** *Clarification to be provided for these sections as recommended and per comment.*

16. Section 15.0, QAPP Worksheet #15, Reference Limits and Evaluation Tables: In addition to the information included on the worksheet, information must be included or referenced for the potential analytical sampling of soil/sediment and drum content disposal.

**Response:** *See responses to comments 10 and 13. Text will be added ahead of the table in Worksheet #15 to refer the reader to the Site 12 MC SAP (Tetra Tech, 2012) for reference limits for soil, as needed.*

17. Section 17.2, Safety Consideration & Exclusion Zones, para 6, Line 895: “Overnight security will be put in place to guard items, if necessary.”

This statement is somewhat contradicted by Section 17.8.1, lines 1138 – 1140 which states “If required by the installation, overnight security will be employed in the event that discovered MEC requiring BIP cannot be treated by the end of the working day it is discovered. It is anticipated that overnight security will not be required, because the site is fenced in.” This is confused further by the SOP 6 for Invasive Operations which states that “If the anomaly is determined by the SUXOS to be MEC and unacceptable to move, it will be left in place and barricaded until it can be safely detonated at the end of the workweek.” Please rectify all these differing statements.

Whether or not overnight security is going to be provided and if MEC items will be detonated at the end of the workday or at the end of the week must be established prior to finalization of the workplan.

**Response:** *Clarification will be made to the referenced section. Because the site is fenced, access to potential MEC items is substantially prevented. Depending on the item, however, the Navy may choose to post a guard if necessary. Items not requiring BIP are stored in the Magazine for consolidated demolition when appropriate.*

18. Section 17.4.4.1, Geophysical System Verification Plan, para 2, Lines 980-981: The total number of blind seed items proposed (6) is low to achieve a high probability of detection. A higher number of blind seed items are needed to have an appropriate quality control of the work being performed. Will the locations of the blind seed items be varied every day to ensure appropriate quality control?

**Response:** *The historic GPO requirement to establish the detection probability has been completely replaced with the Physics-based GSV. This industry standard recommends that detection systems encounter at least one BSI per system per day. This industry standard, coupled with the morning and afternoon IVS data, is all that is required to document that the system is performing consistently and within industry standards. No change in text is required.*

19. Section 17.7.2, Excavation of Target Anomaly, para 2, Line 1081: Will the explosives used to dispose of the MEC also be stored in the magazine or brought in as needed? Please clarify in the workplan.

**Response:** *Clarification will be added that the magazine is for MEC only. Section 17.8 MEC/MPPEH Management and Disposal provides more clarification.*

20. Section 17.7.4, Encountering Significant Non-Munitions Items..., para 2, bullet 3, Lines 1121 – 1124:

- a. Some contaminants, such as PCBs and pesticides, do not stain soil or trigger the PID, therefore if the drums are not intact, the soil underneath must be tested for the full suite of analytes. This section also states “Collect soil samples for full suite of analytes included for soil in the MC RI (2011 SAP). MEDEP is unfamiliar with this workplan, please clarify or correct as necessary. Also

if SOPs or worksheets from other RIs are going to be used as a basis for sample collection, handling and processing for this RI the original workplan needs to be included in the list of references.

**Response:** *The text will be revised to state that in the event that a non-intact container is encountered, notifications and discussions with the USEPA and MEDEP will be accomplished to determine a path forward.*

- b. The field team will need to be prepared to pump off drum contents or to collect samples from drums if intact. If drums will be addressed during this clearance, the plan needs to include appropriate SOPs, instrumentation needs to be onsite for monitoring the breathing zone, or work on those specific areas will have to be delayed until materials are obtained and staging areas are prepared.

**Response:** *As noted above, the focus of this plan is the MEC QAPP. The text on identifying and sampling drums is included for completeness in the unlikely event that drums are encountered. If a drum is encountered, the drum will be handled in accordance with guidance/instructions in Section 17.7.4 and will also involve notifications and discussions with the USEPA and MEDEP to determine a path forward... The third bullet will be revised to clarify that "characterize" means sample.*

21. Section 17.5, Line 1031: Please add MPC to the acronym list in the document.

**Response:** *Agreed.*

22. Section 18, Sampling Locations...: If any areas are excluded from the clearance please survey or define those areas with a GPS.

**Response:** *Agreed.*

23. Section 19.0 QAPP Worksheet #19: Analytical SOP Requirement Table. Please correct the note and add the required information or reference the appropriate information.

**Response:** *The Navy MEC QAPP does not require the use of these SAP worksheets. This WP will not be converted to MC SAP, so reference to the appropriate SAP to follow was added elsewhere, per the previous comments.*

24. Section 21.0, QAPP Worksheet #21: Project Sampling SOP References Table: Please correct the note and reference the SOPs that will be used for the soil sampling, handling and processing, if it becomes necessary.

**Response:** *Sampling SOPs are not included with this QAPP. Clarification will be included in the opening paragraph for worksheet #21.*

25. Section 22.0 QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing and Inspection Table: Please the required information for calibrating the PID.

**Response:** *The PID and reference to the Site 12 MC SAP (Tetra Tech, 2012) Worksheet #22 will be added.*

26. Section 23.0 QAPP Worksheet #23: Analytical SOP Reference Table: Please correct the note and add the required information or reference the appropriate information necessary for soil analyses and for disposal of drum contents, as necessary.

**Response:** *See response to comment 23. A general statement will be added to the subject document that analytical requirements or soil sampling information can be found in the Site 12 MC SAP (Tetra Tech, 2012).*



27. Section 24.0 QAPP Worksheet #24: Analytical Instrument Calibration Table: Please correct the note add the required information for calibrating analytical instruments.

**Response:** See response to comment 26.

28. Section 25, QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection: Please correct the note and add the required information or reference the appropriate information.

**Response:** See response to comment 26.

29. Sections 27, 28 & 30.0, Sample Custody Requirements, QC Samples Table, & Analytical Services Table: If it becomes necessary to take soil samples from beneath drums and/or drum contents need to be sampled and analyzed then these sheets apply. Please correct.

**Response:** See response to comment 26.

30. Section 36.3, QC Step III: QC of Digital Geophysical Mapping, bullets, lines 1512 & 1513: Please provide the basis/reference for the 20% differential in picks between the two teams.

**Response:** The 20% differential between independent DGM processors/analysts developing the same dig list has been used on other Navy projects and allows for slight differences in processing preferences (such as manual DGM target selection that augments the automatic selections, and masking targets that may be outside project boundaries). If all of the major processing variables (e.g., gridding, leveling, latency) are documented and used by both the production and QC, the resulting DGM Targets are typically within the 20% differential. No change in text is required.

31. Figure 2:

- a. The eastern most area identified as a steep slope should be field checked as it appears to be larger than necessary.

**Response:** This area will be investigated and the actual area that is too steep to traverse will have the boundary recorded in the field. However, the figure will be revised for other clarifications and this area will be shown smaller and called "Estimated Steep Slope."

- b. If it has not been done already please discuss in the text what the "demo consolidation locations" will be used for. If "demo" means demolition please do not abbreviate it on the figure.

**Response:** Will add clarification that this is the proposed location for performing demolition of MEC and MPPEH that is safe to move.

## Response to EPA Region 1 review comments, dated 10 September 2013

1. General Comment: The primary work plan objective is to complete geophysical surveys of the Site 12 study area in order to investigate potential subsurface anomalies that may present potential MEC hazards as well as identifying other non-munitions related debris at the site. Of the 24 acres, Approximately 17 acres of the site are expected to be accessible for implementation of EM61-MK2 surveys while approximately 3 ½ acres not accessible with DGM instrumentation will be surveyed using analog detection methods (handheld all-metals detector surveys). EPA concurs with this approach. The remaining 3 ½ acres of the site include DU-2 (existing berm area) and DU-5 (site pond). These remaining areas are in the process of being investigated separately. The Navy has already initiated or completed separate contracting actions to address work required for these two DUs. EPA also concurs with this approach and looks forward to reviewing future work plans addressing DU-2 and DU-5 MEC issues.

**Response:** *Noted.*

2. Current Conceptual Site Model (CSM) – MEC Maximum Penetration Depth: While it is not clear when munitions-related activities began at Site 12, a 1978 aerial photo identifying a berm structure suggests ordnance demolition activities were being conducted by the Navy at this time. As of 1981, the Navy identified this area of the base for the treatment of reported small quantities of ordnance, pyrotechnics, and privately manufactured explosives and war souvenirs. The Navy ceased these activities in 2004.

Based upon the existence of the historical and existing berm structures and typical Department of Defense practices to render ordnance safe, MEC items would be detonated within the berm areas to control the resultant debris. MEC items that would “kick-out” beyond the control berms would not be expected to penetrate deep into the subsurface compared to items within the berm or munitions items being fired as part of training exercises (e.g., weapons firing/bombing ranges). Based upon 2010 MEC surface clearance efforts completed by the Navy, the type and low density of MEC/MPPEH items detected beyond the berm area appears to be consistent with the original CSM. Another important element of the current Site 12 CSM is the existence of non-munitions related (e.g., construction-related) debris which has also been found on the surface of the site and likely exists in the subsurface as well. Unfortunately, the geophysical techniques to be used for this Site 12 subsurface MEC clearance effort cannot differentiate between a MEC item(s) and a piece of construction debris such as a piece of reinforced concrete. Test-pitting of geophysical anomalies, which are a component of work plan fieldwork activities, will resolve these uncertainties.

**Response:** *The Navy is in agreement with this assessment. Areas that exhibit characteristics of debris areas on the DGM target map will be manually selected and recommended for test pitting.*

If the current CSM is still valid with regard to how the Navy conducted historical EOD operations at Site 12, there should be little to no MEC items discovered in the subsurface within the 17-acre work plan study area. Those geophysical anomalies that are identified and excavated in accordance with Section 17.7 of the work plan should only be related to non-MEC, non-hazardous items. Should intrusive digging operations identify a high density or cache of subsurface MEC items at depth and/or buried hazardous waste, the Site 12 CSM will need to be revised accordingly and additional field work will need to be completed.

**Response:** *The Navy agrees.*

3. Section 17.6 – Geophysical Data Processing/Interpretation & Section 17.7 – Intrusive Operations: EPA concurs with MEDEP (letter dated 9 September 2013) that geophysics anomaly maps and contractor-recommended targets for test-pitting should be provided to the Navy & regulators prior to the implementation of intrusive operations. EPA also requests that the contractor provide brief daily fieldwork updates via e-mail during intrusive test-pitting operations to summarize their findings. EPA suggests the creation of a simple spreadsheet that can be regularly updated with a brief description of the anomalies, the depths they were found, and what their final disposition was or will be.

**Response:** *The intrusive investigation process for DGM anomalies includes entering this information into the dig record, which is an extension of the dig list. This information can be provided daily as requested.*

